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ABSTRACT

Although it is generally argued that information technology (IT) is a science rather than an art, very few professionals follow a process of systematic evaluation and revision, usually due to the level of difficulty and time constraints involved. The intent of this document is to provide a framework for evaluation and revision of instructional design and training via the personal computer, or paper and pencil aids. When implemented, this framework organizes and simplifies the process of evaluation. The generic Design Model of Analyze, Design, Development, Implementation, and Evaluation (ADDIE) is utilized, and detailed job aids are provided in the form of rating sheets and checklists. The five major phases of the design model are discussed: (1) front-end analysis; (2) training needs analysis; (3) instructional design; (4) material development; and (5) implementation. Phase 1 identifies a perceived knowledge deficiency and defines the problem. Phase 2 provides a detailed, relevant list of the skills and knowledge that will make up the content of the training course and a preliminary delivery strategy matching the material to be learned to learner characteristics. Phase 3 outcomes include: determining instructional objectives; developing tests for the objectives; confirming overall delivery strategy; and developing design specifications to used in Phase 4. Phase 4, materials development, considers two major areas, appearance and effect. Feedback from pilot testing is used in the final implementation process, phase 5. Checklists of major steps are provided for each phase. Front-end analysis, training needs analysis, and materials development evaluation checklists are included. The final section, "Summative Evaluation of Training," facilitates the evaluation process through the use of either Kirkpatrick's level of evaluation or the Brethower and Rumler adaptation, and the four levels of training evaluation are outlined. An example training follow-up survey is provided. (Contains 9 references.) (MAS)

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A HANDBOOK OF INSTRUCTIONAL AND TRAINING PROGRAM DESIGN

A simple guide to maximize the design of your instruction given your time and/or budget constraints.

A "HOW TO" application of the latest in Instructional Design Principles to enhance the utility (i.e. the efficiency and effectiveness) of your programs through the application of quality control to achieve continuous improvement.

by
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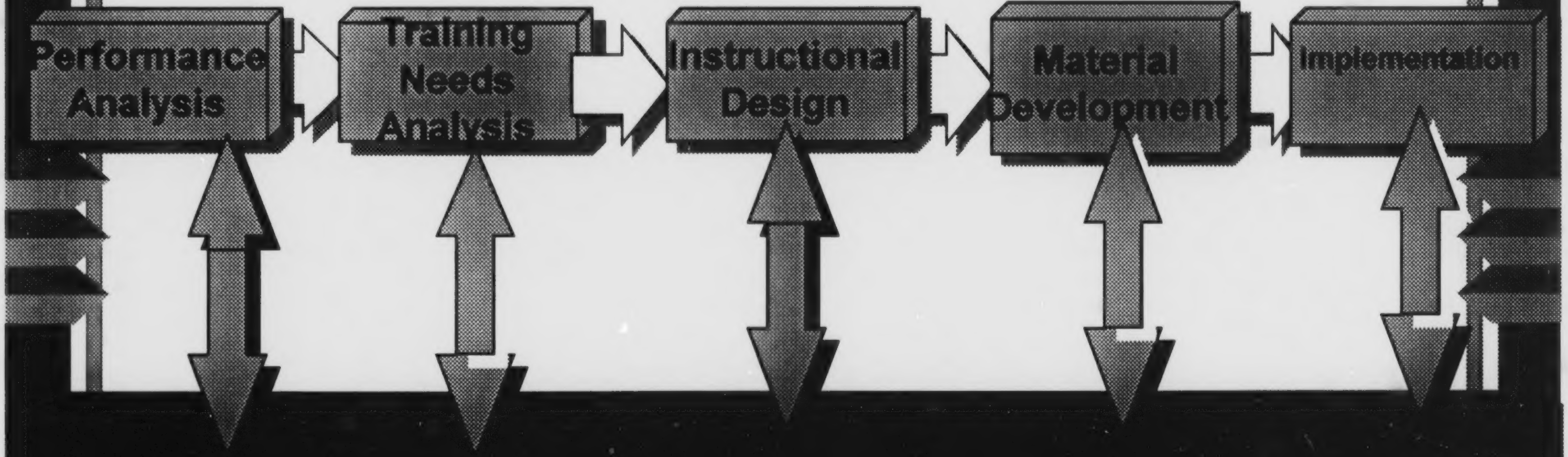
Introduction

It is argued that Instructional Technology (IT) is a science rather than an art largely because of the use of an Instructional Model and the features of evaluation and revision of instruction incorporated in the models. Although most people agree with the above very few, if any follow a process of systematic evaluation and revision for a variety of reasons. Minimally, most of us (this author included) provide for a summative evaluation of results i.e. Level One evaluations and some sort of Formative Evaluation usually a "cruise" of your material by a peer, boss or even spouse. Perhaps the two predominant reason's for the negligence are the level of difficulty and time constraint involved. Ironically, the very reason that make IT a science and not an art are often violated and the science verses art argument thus continues into perpetuity. With the advent of technology and in particular the personal computer this negligence for the two "big" reasons is and should be unacceptable (Criminal Negligence?).

The intent of this document is to provide a framework for evaluation and revision via the personal computer or paper and pencil job aid's that when implemented should organize and simplify the process and eventually terminate the argument, and have IT accepted predominately as the science that it is.

This paper will utilize the generic Instructional Design Model of Analyze, Design, Development, Implementation and Evaluation (ADDIE see next page) and provide detailed job aids in the form of rating sheets and checklists (mechanically or hard copy) for each of the major steps.

Instructional Design Model



Performance Analysis

Training Needs Analysis

Instructional Design

Material Development

Implementation

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Through our own application of technology the very technology we profess to our training clientele and some practice with these job aids, we can properly follow the model and in a timely manner, which is consistent with real world constraints .The following is a brief discussion of the critical steps in the five major phases.

Front-End Analysis

This phase incorporates a Front-End Analysis as well as a Performance Analysis in which potential or actual performance deficiencies which are suspected need to be analyzed. I will not cover Front-End analysis in any detail but the interested reader can consult Thomas Gilberts (1979) "Behavioral Engineering Model", or Rummler and Brache's (1981) model.

Of particular note this phase starts with a request of some sort to investigate a perceived deficiency it does not usually anticipate future problems (new employees) or skills (new Technologies) that might be needed i.e. Proactive Training or Education and Development which is evaluated differently and not part of this paper. The process to be followed in this step is defined in the first section "Front-End Analysis Evaluation"

The primary output's are a Problem Analysis with a clearly defined problem. Does a problem exist and is it worth solving by training or otherwise? or no training or solution is worth the cost. This in turn will depend on the analyses and discovery of what kind of problem it is:

1. They do not know how to perform correctly
2. They don't want to perform correctly (motivation)

3. Something is preventing them from performing correctly

Only in the case of #1 above is there clear justification to continue with the Training and Development Process. The other output of the Front-End Analysis is a Recommended solution; Training or Non- Training. The novice practitioner should be wary of venturing into other areas where he has little or no expertise here. It may not be politically astute to claim another department is deficient. These Outputs then become the inputs of the next step. At this point care must be taken not to make one of the common mistakes Brethower and Rumler (1976.) : 1. To take the input of line management without question and agree to develop training without any real evidence that it is required. 2. To agree on form and length of a training course long before ready. The result is often a course that does not meet the needs and is to expensive and inefficient.

Training Needs Analysis

The goals of this phase are to produce a detailed, relevant list of the skills and knowledge that will make up the content of the course and a preliminary delivery strategy matching the material to be learned to the learner characteristics. Learner analysis (see "Training Needs Analysis Evaluation" pg.TNA 10-11.) is first conducted to determine the training populations characteristics and entry level skills This input is then used to determined a preliminary delivery strategy ("Training Delivery Strategies"pg. 17-19.)

Instructional Design

The analysis we just completed can be used as a blueprint to create Training. Although it is tempting to start developing materials you pay for it in the long run by including irrelevant content and excessive revisions that proper instructional design work would have eliminated.

The major outcomes of this pivotal phase include : determining instructional objectives, developing tests for the objectives, (see "Editing Instructional Objectives"pg. Design 6 and "Media Selection" pg.Design 14) confirming overall delivery strategy including media selection and developing design specifications to be used in the next phase material development. Before proceeding to material development the designer must be satisfied that: the media selected are appropriate for the objectives, the learner, the design and the delivery factors. That the learning activities are based on the events of instruction (see pg. Design 21 "Events Of Instruction")and are consistent with the objectives.

The **most critical step** of the entire process is in the determination of instructional objectives and interaction with the client is imperative in order to assure that: 1) The objectives are appropriate to meet the clients need. 2) The program is designed to meet the objective. Training that is not fully collaborative is likely to be sterile, and ineffective.

Material Development

Appearance (see pg. MD 18-19 "Material Development Evaluation") and effect of all instructional materials is ultimately your responsibility. This includes the student and instructional guide. As an aid to review the final product and before implementation the "Instructional Technology Review", (see pg. IMP 3) should be completed.

The finished product now produced needs to be checked for flow that is a yes answer must be given to the six "final" questions on the "Congruency Check", (see pg. IMP 4-5) or a critical link may be missing.

Implementation

Planning for the pilot testing of the course should occur as early as possible in the training development process. Responsibility for all necessary environmental items such as room and equipment need to be determined and documented. Scheduling of the initial offering and frequency and duration of classes once the course is brought on-stream also need to be agreed to. You need to work closely with the client , SME's and others that need to be present in order to assure the course can be delivered immediately upon completion. The predominant part of the audience should be members of the target audience. The designer needs to be present for the initial offering in order to gather real time feedback from the participants and document any changes that may be needed. During implementation clues to look for include Abella (1986) : 1. Participants talking or not talking about the program. 2. Non-participants not being encouraged to join in conversations. 3. Many cynical remarks. 4. Participants not doing assignments. 5. Participants are late at start or breaks or skip out altogether. 6. Participants do not ask for help or additional information or ideas. 7. Humorous remarks made in class that have no connection to class activities. All these may be signs of impending problems that need further investigation. Adjustments having been made it is now time for the full release of the program. This should only be done when the following have been answered to the clients and your satisfaction:

1. Was the original need accurately defined?
2. Were the objectives appropriate to meet the need?
3. Does the program design achieve the objective?
4. Is the content appropriate to the objective?
5. Are the materials of good quality? interesting and well written?

6 Do the materials do what the design intends them to do?

Summative Evaluation Of Training

The most useful model of evaluation I have found is Kirkpatricks' (1975) level of evaluation or the adaptation by Brethower and Rumler (1976). The tool can be used as follows: Level 1 Are the trainees happy? Level 2 Does the training do what it is supposed to do? Level 3 Are the concepts used (see pg. SE 8-10.) Level 4 Does application of the concepts affect the organization? For each of these levels the who - source of data, what - to measure, where - find data, why - criteria, and how - data gathering method must be answered.

Pepper (1984) the role of the training function with respect to follow up is to assess the extent the new ideas, skills and motivation will get a natural opportunity for exercise and reinforcement. And having done this to recommend steps to overcome any obstacles. This tends to be overlooked by training which often omits to conduct any follow up. We tend to look at the completion of a program as the end of responsibility. This attitude indicates insufficient understanding of the learning process. One has to be thankful that the natural inclinations of people to seek reinforcement on their own without waiting for interest to be shown by others.

Summary

If done well, designing and developing training require a great deal of skill and knowledge. The designer needs to gather experts in instructional development, subject matter, production, computer and media skills. Moreover, all this must be completed on time and within budget. He/She must always assure to the best of their ability that the project addresses the performance problem, meets the true needs of the target population, satisfies your client, and is consistent with the goals of the Company. These job aids (mechanical or other-wise) are designed to greatly simplify the process.

PERFORMANCE/FRONT-END ANALYSIS

From a management perspective it might appear that we are adding a lot of extra time to the project. Upon further examination, the value of Performance/Front-End Analysis is that when you complete Performance/Front-End Analysis and decide to go on to next phase whatever data you collect is still relevant when you get to training needs analysis. Also it is ordinarily completed in a short period of time. The intent is to make a determination as quickly as possible and move on. Experience has shown that the alternative, not doing Performance/Front-End Analysis, you may be well into detailed analysis before you realize training is not the only or best way, thus wasting much more time. The concept is used in other areas of business as well, they will tell you that before they commit dollars or resources they do the same type of analysis. This produces a higher quality product at lower costs. Furthermore Performance/Front-End Analysis provides the basis by which training is evaluated although it is not the only one. One good measure of effectiveness is the degree to which the problems identified in Performance/Front-End Analysis have improved the process. Without the identification of those problems and/or cost reductions we would have a great deal of difficulty evaluating the training's effectiveness. The bottom line is that in the long run the company will save significantly by completing Performance/Front-End Analysis as the first step of each training project.

The Course Manager/Teacher initiates the Performance/Front-End Analysis and must insist that training projects will be undertaken only when a clear need for training has been identified, and where the benefits of training justify the costs. In addition, when other means have been identified they will be considered sooner and with better data for which to make a recommendation. In this phase it is the ultimate responsibility of the Course Manager/Teacher to determine:

1. If there is justification to continue with training development?
2. If some other solution is appropriate and informing and providing all pertinent information.
3. No solution is worth the effort.

The role of the Course Manager/Teacher is to make sure the analysis is completed on time, and in a proper manner, and to serve as devils advocate when reviewing the findings. The Course Manager/Teacher assures that conclusions are justified by the data, after all it is he who arranges for company commitment to the project.

Before proceeding to the next phase the Course Manager/Teacher should prepare with the appropriate staff member a "Performance/Front-End Analysis Report" which includes the following:

1. Who the target performers are? and their location and job titles.
2. How many people were involved and for how long?
3. What problem indicators suggest the need for the project?

4. What methods instruments were used to collect the data?

5. What is the ideal performance vs. actual and what is the cause?

6. What other solutions were considered and why?

7. What is the rationale for your choice ?

The final step is the preparation and review of the Performance/Front-End Analysis report. A performance report on the Performance/Front-End Analysis. As follows:

I. Planning

A. Comprehensive

1. Does the Plan for Performance/Front-End Analysis specify:

a. rationale b. target group c. data requirements

2. Step by step activities

B. Realistic

1) Does the plan take into consideration the nature and scope of the apparent problem?

2) Considered Constraints

a. organizational b. personnel c. time d. resource

II. Clearly defined Problem

A. Reliable and valid data

B. Actual vs. Desired performance

C. Other causes of problem

III. Solutions and recommendations

A. Data reviewed by others who understand the problem

1) Client   2) Subject Matter Expert

B. Have reasonable solutions been checked

C. Is final solution best possible alternative

IV. Feasibility

A. Does the Performance/Front-End Analysis contain adequate information to make a decision for project continuation or other solution?

B. Do sufficient resources exist to work on the solution to the problem?

V. Costs and Risks

A. Are the costs and risks of the solutions identified and accurate?

B. Have the risks and cost of ignoring the problem been considered?

At this point the Course Manager/Teacher must take care not to make one of the common mistakes : 1. To take the input of line management without question and agree to develop training without any real evidence that it is required. 2. To agree on form and length of a training course long before ready. The result is often a course that does not meet the needs and is to expensive and inefficient.

Performance Analysis Evaluation

- ◆Planning
    - Comprehensive
    - Realistic
- ◆Clear definition of the problem
- ◆Relevant deficits
- ◆Comprehensive solutions

Data for Training Requests

IF your client gives this reason for requesting training	**THEN** you have to collect data to answer these types of questions.
This job needs training (for existing, modified, or new jobs)	What are the job related problems in terms of outputs, effects on other work groups, service to the customers, loss of revenue to the region or to the company, etc.?
This is a new system (or method or equipment)	What are the differences between the old and the new? What difficulties do we anticipate? Why? What are the job related problems in terms of outputs, effects on other work groups, service to the customers, loss of revenue to the region or to the Company, etc.?
Existing training is inadequate	What parts of the course are obsolete? What parts of the course are inaccurate? What parts of the course are missing?
We have a new type of student	What are the actual difficulties in training What are the actual problems in terms of outputs?

Data Collection in Performance/Front-End Analysis

To answer this question	Use these sources	And these strategies
What is the apparent problem?	Client	Interview
What are the characteristics of the target group?	Performer, Supervisor, Trainer, Client Job Description	Interview, Observation, Diagnostic Testing, Content Analysis
When is the solution needed?	Client	Interview
What training is currently available?	Trainer, Training Organization	Interview, Observation
Does the performance problem really exist?	Performer, Supervisor, Related Work Groups, Client, Customer Output Productivity Records, Other Raw Data (e.g., loss of revenue)	Interview Observation Diagnostic Testing Survey,
What are the ideals and actuals (anticipated or real)?	Performer, Supervisor, Related Work Groups, Client, Other Experts Output/Productivity Records	Interview, Survey, Content Analysis
What are the major causes of the problem?	Performer, Supervisor, Related Work Groups, Client	Interview,Observation Diagnostic Testing, Survey, Content Analysis

Data Collection in Performance/Front-End Analysis

To answer this question	Use these sources	And these strategies
What are the alternative solutions?	Instructional Technologist, Other Experts	Interview, Survey
What is the cost of not solving the problem?	Client, Supervisor Output/Productivity Records, Raw Data (e.g., loss of revenue)	Interview, Content Analysis Other Analysis
What are the costs of different solutions?	Instructional Technologist, Other Experts	Interview
What is the optimum solution?	Instructional Technologist, Other Experts	Interview

What To Do if a Training Need is Not Confirmed

Directions:
This procedural checklist explains, in a step-by-step fashion, what to do when a request for the development of training is not confirmed by the data you collected. Follow the action steps to identify and justify nontraining solutions in a constructive fashion.

☐ 1. Report the possibility of unconfirmed training to your supervisor as soon as you are reasonably sure. Have data to support your position. seek their advise on what to do next.

☐ 2. Jointly determine if more data is needed.

☐ 3. Maintain your objectivity. Be careful not to let your preliminary conclusions bias your data collection activity.

☐ 4. Analyze your data and write a Performance/Front-End Analysis Report. (see pg 12)

☐ 5. Clearly analyze and report the initiators reasons for the training request.(see pg 6) List all original problem indicators.

☐ 6. State the performance deficit revealed by your analysis. Indicate the ideal verses actual performance. Give relevant data.

☐ 7. State your hypothesis about the primary cause of the performance deficit. Give relevant data.

☐ 8. List alternative solutions that might be considered and why.

☐ 9. Compare the costs of training verses non-training solutions and the risks involved in each.

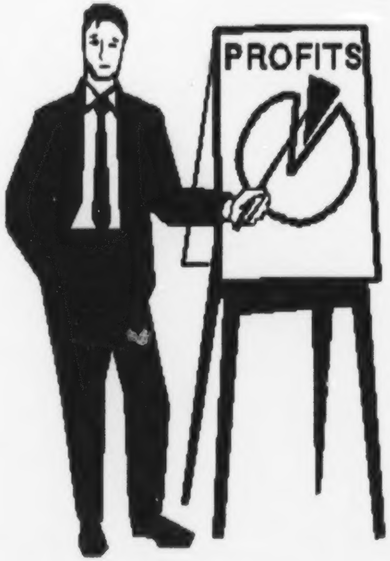
☐ 10. Determine the best method of presenting the data to your customer.

Performance/Front-End Analysis Evaluation

Formative Criteria	Questions	Rating and Comments				
		LOW				HIGH
		1	2	3	4	5
Comprehensive planning	Does the plan for the performance analysis specify the rationale, the target group, data requirements, and step-by-step activities?					
Realistic planning	Does the plan for performance analysis take into consideration the nature and the scope of the apparent problem and the organizational, personnel, time, and resource constraints?					
Clear definition of the problem	Is the performance problem clearly defined in terms of reliable and valid data on the ideal and actual outcomes (or performances)?					
Relevant deficits	Are all deficits that contribute to the performance problem clearly identified and classified?					
Comprehensive solutions	Have the data been reviewed by the people who understand the problem and can recommend solutions? Have all reasonable solutions been investigated?					

Performance Analysis Evaluation

- ◆Realistic Costs
- ◆Appropriate Recommendations
- ◆Follow-Up Feasibility



Performance/Front-End Analysis Evaluation

Formative Criteria	Questions	Rating and Comments				
		LOW				HIGH
		1	2	3	4	5
Realistic costs	Are all the costs and risks of alternative solutions (and of ignoring the performance problem) identified and accurately estimated?					
Appropriate recommendations	Is the final solution (or set of solutions) selected through a systematic comparison of the costs and benefits of all viable alternative solutions?					
Follow-up feasibility	Do sufficient resources exist to work on the solution to the problem? Does the Performance/Front-End Analysis report contain sufficient information on which a decision for project continuation can be made?					

Performance/Front-End Analysis Report

Purpose: To prepare a report for communicating the findings and recommendations of a Performance/Front-End Analysis to your management or client. The report should include the following information.

I. Project Initiation

☐ Who made the request for the training? Comment:

☐ What Organization where they from, location? Comment:

☐ Who are the performers? Comment:

☐ What are the job titles, job descriptions? Comment:

☐ What was the reason given for the request and what evidence or data was given? Comment:

II. Data Collection and Analysis

☐ What were the methods and instruments used to collect the data? Comment:

☐ Does the data confirm the problem as reported to you? Comment:

☐ What is the gap in performance desired verses actual? Comment:

☐ What is the primary and other causes of the deficit? Comment:

III. Conclusions

☐ What solutions are feasible? Comment:

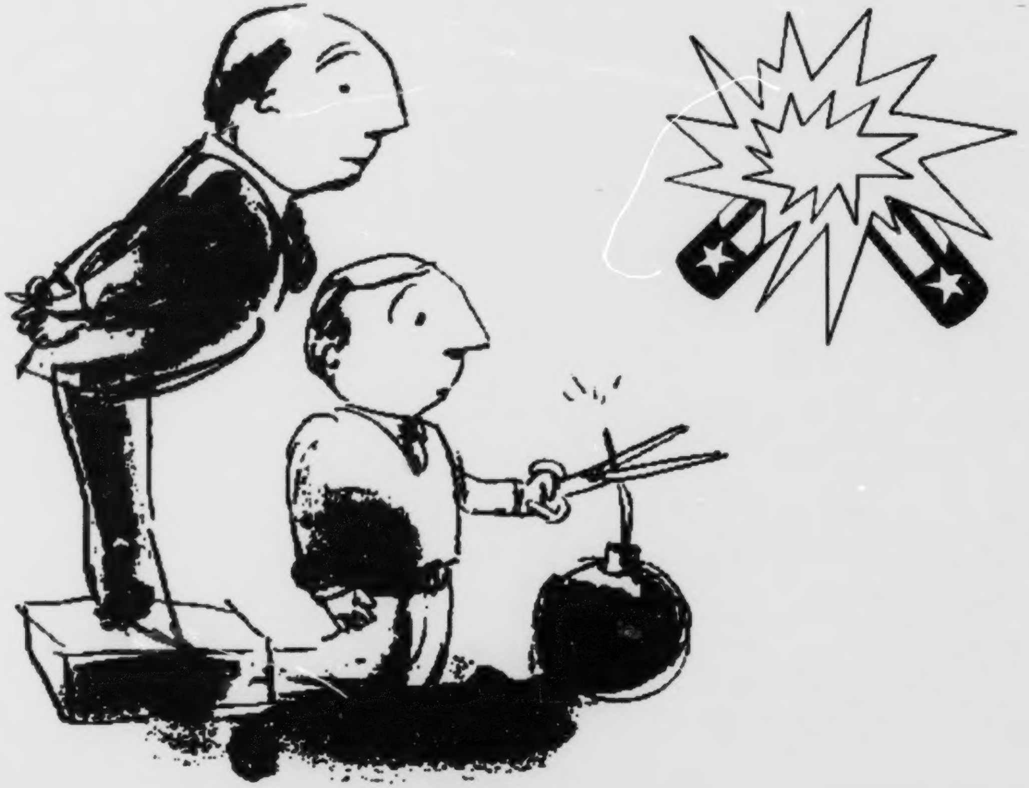
☐ What is the cost of ignoring the problem? Comment:

☐ What is the cost of the solutions? Comment:

☐ What is the optimal solution? Comment:

Training Need?

What would happen if you left it alone?



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TRAINING NEEDS ANALYSIS

In training needs analysis, the Developer/Teacher is still concerned with the adequacy of the data collection plan, and with the validity of the analysis itself and the types of analytical tools used. This is necessary to conclude that the skill & knowledge analysis and classification are performed correctly. The Developer/Teacher oversees the planning and makes sure the resources required and data are available to the team, he also coordinates with other groups. The goal is to produce a detailed relevant skill & knowledge list which makes up the training and a preliminary description of the most effective training delivery strategy or recommendation for other solutions. The Developer/Teacher again is in a position to review the outcomes of the analysis for completeness.

The manager must assure the following questions have been adequately answered regarding learner and task analysis

PLAN

Does the plan take into consideration the nature and scope of the project the resources, required and the constraints if any?

DATA

Are the strategies for collecting all relevant data on learners and skill/knowledge requirements objectively collected through appropriate strategies i.e. interview, observation etc.. Is the data sufficient to complete a detailed task analysis? Has the target population been identified and analyzed? Have there entry level skill and knowledge been determined?

TASK

Does the skill & knowledge list appear complete, accurate and sufficiently detailed? Does the analyst identify prerequisites and what needs to be trained ? Does the final skill & knowledge list identify only those to be trained?

When these questions have been satisfactorily answered we are ready for the next phase.

PRELIMINARY DELIVERY STRATEGY

In assuring the developer is on the right track you must monitor the following:

1) Using data collected from the performance, learner, and task analysis conducted earlier is adequate consideration given to :

a. Who are the students?
b. How will the instruction be developed, delivered? does it exist now?
c. What are the resources and significant constraints?
d. Where are the performers and where will program take place?

e. When is the performance required? When the program will be ready, how long it will take, the number and frequency of offerings?

2) Identified alternate solutions, analyzed the same for feasibility costs and effectiveness particularly:

a. Impact- Level 3 and 4 evaluation the bottom line estimates on improved job performance productivity, adaptability, and motivation

b. Outcomes- Level 2 evaluation did the students learn the objective and in an effective and efficient manner.

c. Process- Performance during the program both of the learner and media selected. Level 1 evaluation .

Checklist of Activities during Training Needs Analysis

PLAN

For conducting learner analysis.
For suitable data collection strategies for learner analysis.
For conducting task analysis.
For suitable data collection strategies for task analysis.
To obtain cooperation from other groups in data collection for training needs analysis.

Identify

Identify skills and knowledge required to perform the job or task.
Identify potential delivery strategies.
Suitable sources of information for task analysis.
Master Performer to demonstrate various skills required for performing the job or task.

Collect

Collect and analyze learner analysis data and summarize the results.
Collect and analyze task analysis data and summarize the results.

Analysis

Conduct a cost-effectiveness analysis of potential delivery strategies.
Make a preliminary selection of the optimum delivery strategy.

Monitor & Review

Training needs analysis activities and provide feedback.
Review and approve the outcomes of training needs analysis.
Review final list of skills and knowledge required for performing the job or task.

Data Collection in Task Analysis

To answer these questions	Use these sources	And these strategies
What tasks constitute the job?	Job descriptions	Content analysis
What is the structure of the task?	Documentation on practices	Observation
What are the skills and knowledge required to perform the task?	Technical documentation	Interview
What prerequisite skills are needed to perform higher-level skills?	Training materials	
How will different levels of enabling objectives help students achieve the overall objective?	Training materials Supervisors	
What are the different levels of skills and knowledge, and how are they related to each other?	Master performer	Observation
What pieces of information are to be presented to the students and in what order?	SMEs	
What are the steps in the task procedure?	Job descriptions	Content analysis Observation

Data Collection in Task Analysis

To answer these questions	Use these sources	And these strategies
How is this task performed?	Documentation on practices	Interview Observation
What is the structure of the standard procedure?	Technical documentation Training materials	Flowcharting
What are the action and decision steps in the procedure?	Technical documentation Managers, Supervisors	Flowcharting
What is the algorithm for solving the problem?	Master performers	Interview
What is the triggering event?	Job descriptions	Content analysis Observation
What are the necessary inputs?	Documentation on practices	Interview
What tools are required?		
What are the outputs?		
What are the standards for acceptable performance?	Technical documentation	
What is the frequency of the subtask in the workplace?	SME's, Master Performers	Interview

Data Collection in Task Analysis

To answer these questions	Use these sources	And these strategies
How much time is needed to complete the subtask?	Supervisors, Master Performers	
How difficult is the subtask to perform?	SME's, Master Performers	
How difficult is the subtask to learn?	SME's, Master Performers	
Are there any dangerous consequences of incorrect performance?		

Data Collection in Learner Analysis

To answer these questions	Use these sources	And these strategies
What are the jobs (or job titles) of the target population?	Corporate census	Content analysis of records and reports
What are the jobs of the secondary populations?	Job description	
How many people are employed in each job?	Job history	
What are the demographic characteristics of the students (e.g., age, sex, and length of service)?	General personnel records	
How much support will the students receive from their bosses and peers for attending this training?	Management Supervisors Representative students	Interview Survey
What is the employment level of the student as related to instructor?	Representative students	
What relevant job experiences do the students have?	Management Supervisors	Content analysis of records and reports
What relevant training have they had?	Former instructors	Interview
What is their general educational background?	Representative students	Survey Diagnostic testing

Data Collection in Learner Analysis

To answer these questions	Use these sources	And these strategies
What skills do they already have?	Performance Analysis Report	Observation Diagnostic testing
What current practices and habits have to be eliminated?	Job description Training records	
What information and knowledge do they have about the task?	Academic records Corporate tests	
What misconceptions are they likely to have?		
What is their attitude toward the training topic?		
What is their attitude toward the delivery strategy?		
What is their level of language?		
What are their language preferences?		
What are their learning skills?		
What types of learning activities do they prefer?		

Training Needs Analysis Evaluation

- Comprehensive planning
- Realistic Planning
- Data collection
  - Relevant
  - Sufficient
- Learner analysis data
  - Skill/Knowledge Required
  - Skill/Knowledge Validity
- Relevant data for Delivery Strategy

Training Needs Analysis Evaluation

Formative Criteria	Questions	Rating and Comments				
		LOW				HIGH
		1	2	3	4	5
Comprehensive planning	Does the plan identify each step in this phase and specify the personnel and schedule requirements?					
Realistic planning	Does the plan take into consideration the nature and the scope of the project, the resources, and the constraints?					
Relevant data	Are all relevant data on learner characteristics and skill/knowledge requirements objectively collected through appropriate strategies?					
Data collection	Have appropriate data collection techniques been identified?					
Sufficient data	Has sufficient data been collected to complete a detailed task analysis?					
Learner analysis data	Has the target population been identified and has enough detail been collected about their entry level skills and knowledge?					

Training Needs Analysis Evaluation

Formative Criteria	Questions	Rating and Comments				
		LOW				HIGH
		1	2	3	4	5
Skill/knowledge requirements	Is the skill knowledge list complete, accurate, and in sufficient detail?					
Alternatives to training	Has each skill or knowledge been analyzed for alternatives to training?					
Skill/knowledge validity	Has each skill and knowledge identified as "entry level" or "to be trained"? Does the final skill/knowledge list include only those which are to be trained?					
Relevant data for delivery strategy	Are all relevant cost and benefit data for selecting preliminary delivery strategy objectively collected through appropriate strategies					

Task Details

Users:
Course Instructor, Teacher, Developer

Purpose:
To identify and record details of a task, a list of subtasks and information sources for each subtask.

Inputs:
Data from task analysis interviews, content analyses, and observations.

Directions:
This worksheet consists of two facing pages.
On the first page, identify the course and the task.
Write a list of subtasks. For each subtask, briefly note your source of information (informant or document) for later verification
On the second page, note the details of the task in the appropriate line. You do not have to complete all details.
If some important task detail does not fit in any of the categories in this page, record it under "Additional Information".
It is helpful to establish a numbering system for tasks and subtasks.
You may need more than one page to list all associated tasks.

Related Worksheets:
Skill Knowledge Requirements
Use the task details from this worksheet to derive a complete set of skill/knowledge requirements.

(Page 1)

Task Details

Course:

Task #: Description:

Subtasks

#	Description	Sources of Information

Task Details

Triggering event:

Input:

Tools and equipment:

Output:

Standards:

Time required:

Importance:

Frequency:

Performance difficulty:

Learning difficulty:

Warnings:

How To Derive Skill Knowledge Requirements

☐ 1.Make a list of skills and knowledge for performing the job or the tasks based on your task analysis.

☐ 2. The same skill may be involved in more than one task. Remove duplicate statements of such general skills.

☐ 3. Keep the statements of skills and knowledge at the same level of specificity. Don't make some very general and others very specific.

☐ 4. Ask the Instructional Technologist and an SME to review your list of skills and knowledge and make suitable revisions.

☐ 5. Transfer your list to the Skills/Knowledge Requirements Worksheet 13).

☐ 6. Cross-reference skills and knowledge Items to associated tasks and subtasks.

☐ 7. Using data from your learner analysis, check off those skills and knowledge your target students already possess.

☐ 8. Review the remaining skills and knowledge and check off those which can be provided through documentation or job aids. Here are the factors which suggest documentation or job aids:

☐ 9. Review the documentation on job aid items to see if any of them require additional training to support their use. Check training for these items (in addition to documentation/job aids).

- Tasks which do not have to be performed rapidly
- Tasks with major negative consequences for incorrect performance

- Several unrelated pieces of information which need not be memorized
- Tasks which will change in the near future
- Lengthy tasks with several steps

☐ 10. Check the remaining Jobs for training.

☐ 11. Ask the Instructional Technologist and an SME to review your worksheet and make suitable revisions.

Skill/Knowledge Requirements

Skill/Knowledge

Task/Subtask	Description	Entry	Doc/JA	Train

Shortcuts

Training Needs Analysis

1. Limit data collection activities: Use smaller data base and SMEs. Rely entirely on faster data collection activities, e.g., content analysis.

2. Informally limit the scope of the project, by eliminating less critical areas of the job from the task analysis, e.g., tasks done less frequently, tasks fewer people have trouble with, and tasks which cause no real problem if done incorrectly.

3. Do not perform diagnostic testing as a part of learner analysis.

4. Ignore secondary populations.

INSTRUCTIONAL DESIGN

The analysis we just completed can be used as a blueprint to create Training. In Training needs analysis we are still concerned with data collection and analysis. Although it is tempting to start developing materials you pay for it in the long run by including irrelevant content and excessive revisions that proper instructional design work would have eliminated.

The major outcomes of this pivotal phase include : determining instructional objectives, developing tests for the objectives, confirming overall delivery strategy and developing design specifications to be used in the next phase material development.

The manager plays a key role in all components but perhaps the most critical is in the determination of instructional objectives and interaction with the client is imperative in order to assure that: 1) The objectives are appropriate to meet the clients need. 2) The program is designed to meet the objective. Training that is not fully collaborative is likely to be sterile, and ineffective. Before the Designer/Teacher gives approval the objective statement should be completed to his satisfaction. The objective Statement should include: 1. The name of the responsible client and his function. 2. The present situation and need for training action 3. The training objectives. 4. The training actions proposed with dates 5. The estimated costs and benefits. 6. The training resources required.

The Designer/Teacher utilizes the statement in the following: 1. Grant approval of the actions to be taken by his training personnel. 2. Gain confidence that it contributes to real corporate objectives. 3. Confidence that line management are in a position to implement what is going to be trained. 4. A basis for control and assisting his staff during the project. Management cannot monitor projects without relevant points of reference and adequate data. The objective statements provides both.

DETERMINE INSTRUCTIONAL OBJECTIVES

Ideal objectives will specify what the learner will be able to do at the end (terminal)that he was not able to at the beginning of the program. Test or test items (enabling) will show that he can do it. Therefore in monitoring objectives the manager must insure that Individual Objectives include: 1. Behavior- The objective clearly identify observable, measurable, repeatable behavior which the student can demonstrate.

2. Specifies the conditions under which it the performance is to take place.

3. Sets the standard of performance in terms of time or error limits in which minimal acceptable performance takes place or how we will determine when mastery is achieved. He must also look at all objectives for :

1. Relevance- Are the enabling objectives relevant to achievement of the terminal objective and Are the terminal objectives relevant to achievement of the desired performance?

2. Sufficient- Do the enabling objectives specify all the requirements which sum to the performance required in the terminal objectives?

3. Appropriate- Is the language scope and difficulty of the set of objectives suitable to the target audience?

TESTS AND TEST SPECIFICATIONS

Test specifications need to be approved by the Designer/Teacher. They should include: the skills/knowledge covered , instructional objectives, instructional content covered by the test, as well as, the type of test item and test. In determining these the next two charts should be used.

SELECTION OF INSTRUCTIONAL MEDIA AND METHODS

In selection of media the first thing the designers should have considered are the attributes required by the objectives and their domain of learning : auditory, visual or kinesthetic and that required by the learners e.g. reading level, cognitive ability. Consideration then must be given to costs and availability of the preferred media. For this reason, it is best to have designers submit a list of the required attributes along with a alternate method if one exists.

If delivery is to be grouped paced and instructors are available then the managers first choice is usually lecture and discussion as this is easiest on his staff and can be effective if learners are highly motivated and experienced at turning knowledge into application. More importantly though for most training is assurance of transfer of learning. Although this is more difficult for the instructor (facilitation skill is necessary) behavioral based instruction is more effective with most learners. The closer to real life practice the case study or simulation given an effective summary is practiced the greater the chance for transfer. If there is opportunity for learner controlled instruction then various programmed instruction techniques should be considered: self-paced CBT, interactive-video, audio and/or video.

Whichever choices are made depending on which characteristics fit the situation, managers must sign off on all content of major learning activities for the events of learning: motivation, orientation, perquisites, presentation, learning guidance, practice, feedback, assessment, retention and transfer regardless of media or method.

Before proceeding to material development the manager must be satisfied that: the media selected are appropriate for the objectives, the learner, the design and the delivery factors. That the learning activities are based on the events of instruction and are consistent with the objectives.

Checklist of Activities During Instructional Design

PLAN

☐ Instructional objectives for the course.
☐ Course structure.
☐ Design specifications for the course.
☐ Specific presentation techniques for each instructional objective.
☐ Specify learning activities for each instructional objective.

Confirm

☐ The choice of the delivery strategy.

Develop

☐ Criterion test.

Coordinate

Ongoing evaluation of various products during this phase.

Developing Instructional Objectives

Purpose:
To specify instructional objectives for a course and to review them.

Input:
Skill/knowledge requirements and task details from training needs analysis.

Directions:

1. Fill out a worksheet for each significant skill or knowledge identified during training needs analysis which is classified under training.
2. You do not have to fill in every box in this worksheet. Do not clutter it up with obvious, unnecessary, or trivial information.
3. Provide information in the behavior box to clearly indicate what is being done.
4. List only critical conditions. It is unlikely that any objective will require condition statements in all four boxes.
5. List only critical criteria.
6. Use the completed worksheet to write your statement of the instructional objective. For internal use, you may utilize the worksheet to communicate with the other members of your team.

Related Job Aids:

1. Editing Instructional Objectives
   Use this checklist to edit and revise your statement of the instructional objective.
2. Test Specifications Worksheet
   Use the objective to select the appropriate test format.

Instructional Objectives

Individual Instructional Objectives

◆ Behavior

◆ Conditions

◆ Criteria

Set of Instructional Objectives

◆ Relevance

◆ Sufficiency

◆ Appropriateness

Editing Instructional Objectives

Individual Instructional Objectives

1. Behavior. Does the objective clearly identify an observable. measurable, repeatable behavior which the performer will be able to demonstrate?

2. Conditions. Does the objective specify the important circumstances in which the performance is to take place, including the physical environment, equipment and tools, references and job aids, and inputs from others which are required, permitted, or denied to the performer?

3. Criteria. Does the objective set the standard for the minimum acceptable performance in terms of such factors as time limit, error limit, product features, and procedural requirements?

Set of Instructional Objectives

4. Relevance. Are all the enabling objectives relevant to the achievement of the terminal objective? Are the terminal objectives relevant to the achievement of a corporate goal?

5. Sufficiency. Do the enabling objectless specify all the required behaviors which add up to the performance required in the terminal objective?

6. Appropriateness. Are the language, number and the level of detail of the set of objectives suitable for the intended audience and Purpose?

Objective Tests

General

☐ 1. Is there a place for the student's name and date?
☐ 2. Is the course name/number and test name indicated?
☐ 3. Are the pages/questions numbered correctly?
☐ 4. Is the test assembled correctly (pages in order)?
☐ 5. Are there directions on how to take the test/sections of the test?
☐ 6. Has correct grammar been used in all test items?
☐ 7. Have vague/ambiguous terms been avoided?
☐ 8. Does each test item contain only one idea?
☐ 9. Is there only one correct answer for each test item?
☐ 10. Is the test written at the trainee's level of comprehension?
☐ 11. Does the correct answer to one question give a hint/cue to the correct answer of another?
☐ 12. Are there duplicate questions?
☐ 13. Are all parts of the question on the same page?
☐ 14. Is a means provided to record the answer to each item (a blank, an answer sheet, etc.)?
☐ 15. Do the directions clearly indicate what the trainee is to do with the diagram/chart?
☐ 16. If labeling is required, are there spaces provided?

Short Answer/Fill-In Test Items

☐ 1. Is the item constructed so that only one briefly written answer is possible?
☐ 2. For incomplete sentence items, does enough of the statement remain to convey the intent to the trainee?
☐ 3. Does the main idea of the incomplete sentence precede the blank (blank at/near end of sentence)?
☐ 4. Has only a significant word/term/symbol been omitted?
☐ 5. For numerical answers, has the degree of precision required been included in the stem?
☐ 6. Have negative or double negative stems been avoided?
☐ 7. Has a list of acceptable responses (variations of answer that are considered correct) been included in the answer code?
☐ 8. Are there any typographical errors/misspellings?

Multiple-Choice Test Items

☐ 1. Have negative and double negative stems been avoided?
☐ 2. Have grammatical clues been avoided?
☐ 3. Is as much of the wording as possible in the stem rather than each distracter?
☐ 4. Are all distracters of an item approximately the same length?
☐ 5. Are all distracters of an item plausible?
☐ 6. Are enough distracters present in each item to reduce guessing?
☐ 7. Are distracters arranged in an orderly manner (alphanumeric, chronological)?
☐ 8. Have distracters such as "all of the above, none of the above, A and B, etc." been eliminated?
☐ 9. Have vague words (may, should, could, might, usually, normally, etc.) been avoided?
☐ 10. Are all parts of the question/answer on the same page?
☐ 11. Are there typographical errors/misspellings?

How to Select the Optimum Delivery Strategy

1. Define the context in which the course development project is to take place. Use data from the performance, learner, and task analyses conducted earlier to answer these questions:
What is the performance problem for which the course is to provide a solution?
Who? Who are the target performers/students for the proposed course? Who will develop the course? Who will deliver the course? Who will manage these activities?
Where? Where are the target performers located? Where will the course be delivered?
When? When is the improved performance required? When should the course be on line? How long should it last? How many times will it be offered? How frequently will it be offered?
What? What are the resources and constraints on the design, production, and delivery of the course?

2. Identify alternative delivery strategies. Consider these alternatives and add any others: SME-led training; teletraining; materials-based, instructor-led training; self-paced print; self-paced nonprint; computer-based training; and interactive video.

3. Select feasible alternatives. Use the previous decision table and eliminate those strategies which are inappropriate for the proposed course.

4. Estimate effectiveness of each alternative delivery strategy. Use best available expert estimates of the effectiveness. Be conservative about the effectiveness of any strategy which you prefer. Here are some indicators of effectiveness for you to consider. You may want to add others:
Impact. Economic impact on the bottom line of the organization. Increased productivity. Improved job performance. Improved job satisfaction.
Outcomes. Application test results. End-of-course test results. Unit test results.
Process. Student performance during course. Student satisfaction. Instructor performance. Instructor satisfaction.

5. Estimate costs of each alternative delivery strategy. Use the best available estimates for the base costs. Use the next worksheet for computing total cost figures.

6. Compare the alternative delivery strategies on costs and effectiveness. Select the delivery strategy which can provide most effectiveness at least cost

How To Select the Optimum Delivery Strategy

Users:
Teachers/Instructors

Purpose:
To select the optimum strategy to deliver a proposed course.

Inputs:
Learner and task analysis data.
Skill/knowledge requirements worksheets.
Information on feasible delivery strategies.

Directions:
Use this checklist in conjunction with the preceding decision table and the following matrix.
Read through the checklist to become familiar with the procedure.
Modify the checklist to suit your local needs.
Refer to the checklist as you work through the procedure. Check off each step as you complete it.

Related Job Aids:
Training Delivery Strategies

Training Delivery Strategies

USE this delivery strategy	IF these conditions are present
SME-LED TRAINING	Several SMEs are available. Only a limited number of students need to be trained. Training is needed urgently. Budget is limited. Students are located at the training site. Competent instructional designers are not available. Course content is likely to change in the near future. Requires approximately 20 - 40 hours of development for one hour of delivery.
TELETRAINING	Several students need to be trained. Students are located in different remote areas. Only a few SMEs are available. Hardware and technical personnel are available. Local logistic and instructional support are available. Course content is likely to change in the near future. Requires approximately 20 - 80 hours of development for one hour of delivery.
MATERIALS- BASED, INSTRUCTOR-LED TRAINING	Content is not likely to change in the near future. Instructors can be recruited and trained easily and are willing to follow directions Enough time and money is available for the production of instructional materials. Competent course developers and team members are available. Requires approximately 40 - 80 hours of development for one hour of delivery.

SELF-PACED PRINT	Content is not likely to change in the near future. large numbers of students have to be trained. Students are located in different areas. Students have sufficiently high reading abilities. Budget for materials development is limited. Competent instructional designers and writers are available. Requires approximately 60 - 80 hours of development for one hour of delivery.
SELF-PACED NONPRINT	Content is not likely to change in the near future. Students are located in different areas. Students have low reading abilities. Adequate budget for materials development is available. Competent instructional designers, writers and media production people are available. Media equipment needs is available at different locations. Requires approximately 80-100 hours of development for one hour of delivery.
COMPUTER-BASED TRAINING	Large and or geographically dispersed population. Difficult for students to leave job for training, or timely delivery is critical Job/Tasks are critical requiring mastery before performance in a live environment Critical aspects of performance can be simulated using computer text, graphics, animation Ability to make and disseminate minor content changes quickly is desirable. Competent CBT specialists and other personnel are available Requires approx. 100-150 hrs. of development for each hour of delivery.

INTERACTIVE VIDEO	Large and/or geographically dispersed target population Difficult for students to leave job for training, or timely delivery is critical Job/Tasks are critical requiring mastery before performance in a live environment Simulations of critical job tasks and/or interpersonal skill require the realism of video/audio Adequate budget and development time is available Ability to make and disseminate minor content changes quickly is desirable Competent interactive video specialists and other personnel are available Requires approx. 150 250 hrs. of development for each hour of delivery

MEDIA SELECTION

- Identify media attributes required by the instructional objectives
- Identify media attributes required by students
- Determine media resources and constraints
    - delivery system ; available to your students
    - production resources costs, and constraints in your organization
- Make a list of the required media attributes, resources, and constraints
- Select the appropriate medium or media combination based on this list.

MEDIA SELECTION

☐ 1. Identify media attributes required by the instructional objectives. For example, the task may require color and sound.

☐ 2. Identify media attributes required by students. Use the information collected during learner analysis. For example, if your students do not have high reading ability, the media attribute of transmitting text is irrelevant.

☐ 3. Determine media resources and constraints in the delivery system. For example, if the training centers have video equipment, this should be taken into account.

☐ 4. Determine media resources available to your students. For example, most students have access to audiocassette players at home or in their automobiles.

☐ 5. Determine media production resources costs, and constraints in your organization. For example, if you do not have any television cameras, you may not want to undertake local videotape production.

☐ 6. Determine media production talents and skills among the members of your team.

☐ 7. Make a list of the required media attributes, resources, and constraints. Select the appropriate medium or media combination based on this list.

Selecting Instructional Methods

IF these conditions are present . . .	**THEN consider using these instructional methods.**
Delivery system is group-paced. Trained instructor available. Instructor Guide available.	Lecture Discovery Learning Discussion Inquiry Method
Delivery system is group-paced. Students have considerable experience and expertise. Instructor capable of facilitating group activities.	Debriefing Instructional Game Peer Tutoring Role-play Structured or Guided Discussion
Delivery system is group-paced. Transfer of training important. Students have considerable experience and expertise. Instructor capable of facilitating group activities.	Case study Critical Incident Process Simulation
Delivery system could be group- or individual-paced. SME master performer is available. Content involves use of equipment and tools	Laboratory Experience Modeling On-the Job Training Supervised Practice
Delivery system is self-paced. Instructors/SMEs not available. Students dispersed over a wide area.	Adjunct study guide Drill and Practice Independent Study Learner-controlled Instruction Programmed Instruction

Instructional Methods

Adjunct Study Guides	Instructional supplements which enable us to convert to existing materials for independent study. This method provides instructional objectives, criterion questions, practice exercises, study suggestions, transfer assignments, and structured note-taking materials to support one or more textbooks and other instructional materials.
Case Study	In this method, the student is presented a well-documented description of a simulated or real-life situation. The learning experience comes through recognition, analysis, and solution of the problem written into the case. The cases may be worked individually; they may also be completed in groups to allow interaction and feedback of participants.
Critical Incident Process	The incident process is a variation of the case study and differs from it primarily in the amount of information given the participant. In the case study, all documentation is provided; in the incident process, the participant is provided only an incident critical in the development of the problem and must seek out the additional facts required (usually from the instructor).
Debriefing	An instructional activity which follows any other intense, interactive instruction (such as role-playing) in which the instructor asks a series of questions to elicit important insights from students. Debriefing questions usually draw attention to the data from the students' experiences in the earlier activity so that they can discover relevant principles.
Demonstration	A master performer shows how to use an equipment or tool, explaining each step of the procedure. He or she also explains the actions, decisions, and precautions required so that students can follow the procedure and understand the rationale for various steps.

Discovery Learning	This method uses a series of activities or questions to lead the student to discover basic concepts, principles, and rules in an instructional area.
Discussion	The leading experience in the unstructured discussion is controlled by the participants who also provide the subject matter expertise. Participants also provide the direction and effort towards reaching the desired goal.
Drill and Practice	Repeated presentation of material and test of acquisition until responses meet criteria.
Independent Study	Reading, instruction, practice, etc. are done at the discretion of the student without guidance from the instructor
Inquiry Method	Presentation of data, information, etc. in response to student inquires. In some cases, the form and order of presentation is adaptive based on previous responses by the student.
Instructional Game	A small-group instructional technique which is characterized by rules for playing and for winning. Games usually incorporate an element of conflict (against other players or against time limits, for example). Winning the game is related to the mastery of the instructional objectives. If the game reflects some real-world process, it is called an instructional simulation game.
Laboratory Experience	Participants practice utilizing the actual or simulated versions of equipment, materials, and procedures that they will ultimately use on the job.
Learner-Controlled Instruction	This method allows students to make key learning decision on pace, sequence, content, and method of evaluation. Learner-controlled instruction incorporates a variety of instructional materials in providing options to students.
Lecture	Oral presentation of instructional content to students who can only respond

intermittently during that presentation.

Modeling	The student is shown how something operates, is repaired, etc. by being shown and led through the appropriate steps, actions, and decisions required. Modeling places emphasis on student performance (imitation) following an expert's performance (model).
On-the Job Training	On-the job training is the best possible way to bring a trainee into close contact with the job while under training. The supervisor or an experienced worker serves as the instructor. The trainee is shown how job procedures are carried out. The student is gradually made to do more and more of the job. For a limited number of jobs, or learners, this type of training is feasible and adequate.
Peer Tutoring	An instructional strategy in which students are selected and trained to teach less advanced students or their peers. Tutoring has been shown to benefit both the tutor and his or her student.
Programmed Instruction	Primarily designed for individualized, self-paced .training. Material is prepared and presented in a series of well-planned sequential steps. The trainee must choose a correct statement from a given set of statements, fill in blanks, write out answers to questions, or perform in any way required. With this training method, the student gets immediate feedback. Upon giving the correct response, he or she receives information as to its correctness. The trainee can then proceed to the next step. In the event that the wrong response is given, the trainee is told to review the material and to give another answer, or he is given an explanation of why the response was wrong.
Role-play	The learning experience in role-playing is primarily interactive. A particular situation is presented, and participants assume specific character roles in the interaction. Role-playing typically attempts to simulate the job environment.

Simulation	Participants, individually or as teams, represent decision makers in an organization. They make the same kind of decisions they might make in a real situation but the data and the environment are simulated. Simulation is often done by means of games which can be paper-and-pencil exercises or computerized activities. These simulation games closely approximate the real world in that the data used by the trainees is the same, but they normally operate in a compressed time frame.
Structured or Guided Discussion	Questions prepared in advance are directed to students to guide the discussion along a preconceived path. The discussion is restricted within predetermined boundaries to ensure the group stays on track.
Suggestive-Accelerative Learning	Initially used for language training, this method combines relaxation, positive suggestions, music backgrounds, high multisensory inputs, and visual imagery to increase concentration and to reduce stress and anxiety.
Supervised Practice	Practice is done under direct supervision of someone such as an instructor or supervisor.

Design Specifications Report

I. Introduction

- ☐ 1. Project background (including significant constraints)
- ☐ 2. Course outline
- ☐ 3. Course schedule
- ☐ 4. Summary of performance analysis data
- ☐ 5. Summary of learner analysis data
- ☐ 6. Proposed delivery system
- ☐ 7. Notes on instructional media and methods
- ☐ 8. Test specifications(or tests)
- ☐ 9. Precourse materials and activities

II. Design Specifications for Each Lesson

- ☐ 1. Title
- ☐ 2. Time
- ☐ 3. Prerequisites
- ☐ 4. Objectives
- ☐ 5. Content outline
- ☐ 6. Instructional activities (events of instruction)
- ☐ 7. Instructional materials:
  - Student Materials (Student Guide, workbook, floppy disk, etc.)
  - Instructor Materials (Instructor Guide, Administrator Guide, etc.)
  - Media (transparencies, videotapes, slides, etc.)

Events of Instruction

Event	Intention	Cognitive Psychological Process
Motivation:	Get the students ready to learn.	Prepair patterns of neural impulses
Orientation:	Preview the course, providing an overview of the expectations for he students and review the instructional objectives.	Activate a process of exectuive control
Prerequisites:	Recall prior instruction or provide supporting skill or knowledge that will help the students learn the new material.	Retrevial of prior learning to working memory
Presentation:	Present the new material.	Emphaize features for selective perception
Learning Guidance:	Provide instructional help to assist students in achieving mastery of the material.	Semantic Encoding & cues for retrevial
Practice:	Require the students to practice integrating and perfecting new skills and knowledge.	Activate response generators
Feedback:	Provide accurate and timely information to the students about their performance.	Establish reinforcement
Assessment:	Evaluate the students performance	Activate retrevial situational reinforcement
Retention & Transfer:	Give opportunities to the students to integrate what they have learned into their jobs.	Integrate with prior knowledge & provide cues and strategies for retrevial

Learning Activities

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Language Review

	poor				excellent
1. Organization of content. (Are the lessons and other units of instruction logically organized?)	1	2	3	4	5
2. Use of subheadings. (Does the instructional materials use a consistent set of headings to reveal the structure to the students?)	1	2	3	4	5
3. Length of lessons. (Are the lesson of a suitable length to permit mastery in a suitable period of time?)	1	2	3	4	5
4. Clarity of presentation. (Does the course present information in a plain language and avoid unnecessary jargon?)	1	2	3	4	5
5. Concise style. (Does the course present information in a lean and succinct fashion?)	1	2	3	4	5
6. Paragraphing. (Are the reading materials divided into short, logical paragraphs?)	1	2	3	4	5
7. Use often technical terms. (Are technical terms used efficiently? Is each term clearly defined during its first usage?)	1	2	3	4	5
8. Consistency. (Are different technical terms used in a consistent fashion? Are the lessons organized in a consistent format?)	1	2	3	4	5
9. Evidence of proofreading. (Are the course materials free from language and typographical errors?)	1	2	3	4	5
10. Use of illustrations. (Are illustrations used for clarification rather than for decoration?)	1	2	3	4	5

Test Specifications

Course Title:

Test Title (or Number):

Skills/knowledge covered by the test:

Instructional objectives covered by the test:

Instructional content covered by the test:

Time requirement:

Test placement in relationship to training:

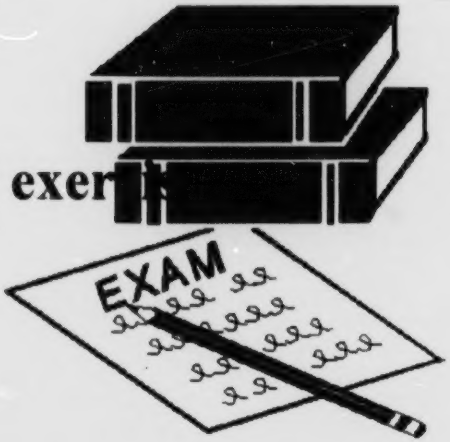
Type of test/test items:

Test administration notes:

Follow-up notes:

Instructional Design Evaluation

- Objectives
  - Comprehensive
  - Relevant
  - Detailed
  - Valid
- Comprehensive & valid tests and exer
- Confirmed Delivery Strategy
- Media Appropriatness
- Events of Instruction



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Instructional Design Shortcuts

1. Abbreviate instructional design specifications.
2. Do specifications for larger units of instruction.
3. Use subject-matter experts as instructors or administrators.
4. Require SMEs to deliver the course from undetailed *Instructor Guide*.
5. Produce easily developed materials (e.g., instructor-led instead of self-paced; print instead of elaborate media).
6. Borrow from existing courses whenever possible.
7. Incorporate documentation and job aids in the course materials or use them instead of the course materials.

MATERIAL DEVELOPMENT

Appearance and effect of all instructional materials is the ultimate responsibility of the Designer/Teacher. This includes the student and instructional guide. It is his responsibility for all materials and his name should appear on all materials. As an aid to review the final product and before implementation the following should be answered:

1. Is the delivery strategy the most cost effective one?
2. Are the course objectives understandable and stated in an acceptable format?
3. Do the tests directly measure the achievement of the objectives?
4. Does the course present all critical information related to the objectives rather than nice to know, or trivia?
5. Does the course use the most cost effective combination of media? and methods?
6. Does the course include appropriate learning activities for the different events of instruction?
7. Do the media achieve high production standards?
8. Is the difficulty level of the course and material suited for the target population?
9. Does the course provide opportunities for the practice and review of critical skills and knowledge?
10. Does the course have provisions for timely feedback to the students on his performance?
11. Does the course emphasize the application of skill and knowledge back on the job?

The finished product now produced needs to be checked for flow that is a yes answer must be given to the six "final" questions or a critical link may be missing:

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MATERIAL DEVELOPMENT

1. Check the statement of the performance problem against the corporate goal.
   - ☐ Is the problem worth solving?
2. Compare the skill/knowledge requirements against the performance problem.
   - ☐ If your target performers acquire these will it eliminate the problem?
3. Compare the overall goal and instructional objectives for the course against the skill & knowledge requirements.
   - ☐ Are the objectives directly related to the skill & knowledge?
4. Compare the posttest against the instructional objectives.
   - ☐ Does the test measure the achievement of these objectives?
5. Check the course contents against the final test .
   - ☐ Will these contents help the student achieve a high score on the posttest? When in doubt throw it out!
6. Compare the teaching-learning activities against the course contents and the posttest.
   - ☐ Will these activities enable the students to process the content and achieve a high score on the posttest?

Checklist of Activities during Materials Development

Coordinate

- ☐ Appropriate support personnel (media production specialists and course writers) to ensure that the design specifications are reliably translated into instructional materials.
- ☐ Materials development activities by support personnel.
- ☐ Review walk-through by subject-matter and other experts.
- ☐ Development testing of the prototype materials.
- ☐ Field trials.

Plan

- ☐ On designing and conducting review walk-through by subject-matter and other experts.
- ☐ On designing and conducting development testing of the prototype materials.
- ☐ On designing and conducting field trials.
- ☐ Monitor MD activities and provide feedback.

Analysis

- ☐ Of data from development testing and field trials and suggest suitable revisions.
- ☐ Coordinate ongoing evaluation of various products during this phase.

Revise

- ☐ Review evaluation results and ensure suitable revisions are made. Distribute evaluation results to relevant people.

Instructional Materials Review

Print

☐ 1. Consistency. Use a consistent format throughout the printed book. Each lesson or chapter should have the same format.

☐ 2. Format. Use either a horizontal or a vertical format for your book. Do not mix them up so that the student has to turn the book.

☐ 3. Divisions. Keep each section (chapter or lesson) clearly identified. Within each of these sections have a consistent layout for different units (e.g., objectives, previews, and summaries).

☐ 4. Headings. Keep all heading levels clear and consistent. Use headings frequently.

☐ 5. Headers. Make sure each page has a header .

☐ 6. Footers. Provide a footer for each page with references if any and page number.

☐ 7. Pages. Organize the contents of a page clearly and consistently.

☐ 8. Spacing. Have a consistent spacing for words and sentences.

☐ 9. Justification. Avoid justifying the right margin. A ragged right margin Is easier to read.

☐ 10. Word breaks. Avoid hyphenating words at the end of the line.

☐ 11. Page break. Determine the stopping point at the bottom of the page by the content rather than by layout. Avoid breaking related materials at the bottom of the page.

☐ 12. Copyability. Use typefaces which will not deteriorate with repeated copying.

☐ 13. Margins. Leave ample margins for ease of binding and for notes.

☐ 14. Illustrations. Make sure that illustrations support the text content and are relevant to it.

☐ 15. Placement. Make sure that the illustration is placed in such a way that all references to it are on the same page.

☐ 16. Captions. Make sure each illustration has a caption to identify and to describe it.

☐ 17. Graphics. Consider the use of diagrams and flowcharts instead of lengthy paragraphs of narrative prose

☐ 18. Tables. Use tables whenever possible to present information in an organized fashion.

☐ 19. Table placement. Make sure the table is placed in an area where all of the accompanying text is available.

☐ 20. Color. Avoid using color because it is expensive and, except in some special cases, does not contribute to the instructional effectiveness.

☐ 21. Binding. Organize the materials into tabbed sections for ease of reference.

☐ 22. Emphasis. Use bold face, underlining, and italics to emphasize key words. However, avoid their overuse.

☐ 23. Colored pages. Consider the use of colored paper to identify different sections of the book.

Audio

☐ 1. Language. Use simplicity in your script. Among other things, use contractions frequently. But refrain from extensive use of acronyms.

☐ 2. Words. Avoid technical. Keep jargon and technical terms to a minimum.

☐ 3. Voices. Keep the number of characters at a minimum.

☐ 4. Sound effects. Whenever appropriate, use sound effects to add realism to the audiotape.

☐ 5. Music. Use music to signal logical units of thought. Make sure you are not violating copyright laws with your use of music.

☐ 6. Interactively. Provide opportunities for the student to actively participate. Do not sound as if you are lecturing to a large group, but try to simulate a conversation with an individual.

☐ 7. Print support. If the audiotape is accompanied by a workbook, make sure that the instructions on the tape (e.g., page references) are accurate and consistent.

☐ 8. Directions. If the tape has to be stopped while the student works out a problem, for example, be sure to include appropriate directions. Also, include directions at the end of one side of the tape to turn it over.

☐ 9. Visual support. If the audiotape is accompanied by a set of slides, make sure the visual message on the slides and the auditory message on the tape reinforce each other. Avoid distracting or overly redundant combinations.

☐ 10. Visual changes. Make sure that slide changes are carefully coordinated with the audioscript. Do not leave the same visual on the screen for long periods of time.

Type

1. Do not use decorative styles. Use familiar sans serif type style for titles and serif for body text.

2. Type size. Do not use type size smaller than one-fourth inch (4 point).

3. Alignment. Center all titles. Begin all other text at the left margin.

4. Capitalization. Use all caps for titles and major headings. For the main body, use only initial capitals.

5. Spacing. Leave more space between units of text than within units. For examples, double
6. space between "paragraphs" and single space within paragraphs.

7. Listing. Use numbers, letters, or bullets to identify each item on a list. Numbers are best, especially when you have to refer to different items. Use bullets if you want to avoid suggesting any sequence in your list.

8. Indentation. If you have a nested list (i.e., a list containing different levels) use indentation to show the levels.

Slides

1. Necessity. Is the slide really necessary? If you have doubts, leave it out.

2. Format. Always use the horizontal format for slides.

3. Scale. If you are showing an object which is unfamiliar to the students, include some familiar object in the same slide to suggest the size.

4. Perspective. If you are showing equipment or tools, show it from the point of view of the student.

5. Graphics. If you are using a graphic, be sure It is simple. Avoid all unnecessary decorations.

6. Legibility. The illustrations and the text in the slide should be legible to a student seated the last row.

7. Color. Most students expect color slides. Unless there is some special reason, avoid black and white graphics in your slides.

8. Captions. Use text sparingly. If you need to use captions, use a clear and simple typeface.

9. Sequence. Make sure the slides are sequenced in the proper order.

10. Audiovisual combination. Most slides are accompanied by an audiotape or instructor talk. The auditory message should not clash with
(or be extremely redundant with) the visual message on the slide.

How To Conduct a Walk-Through

☐ 1. Plan your walk-through carefully to obtain useful data. Include in the plan details of what you want to test, and what type of data you need. Identify your experts and prepare a schedule.

☐ 2 . Select the students on the basis of the information you want to collect.

☐ 3. Use two experts for each area of evaluation. Compare their comments and decide which ones are critical

☐ 4. Focus the review of each expert by giving them a clear indication of the type of feedback you want. It is not enough for you to plunk down a set of materials and say, "I would like to have your comments."

☐ 5. You may want to provide the instructional objectives to some experts and withhold them from others. You should be interested in finding out the reactions of people who are not biased by the statements of your intended outcomes.

☐ 6. Suggest to the experts that they make suitable changes on the materials. If this is not feasible. ask them for specific solutions rather than general comments.

☐ 7. Ask your expert to give the comments and suggestions in writing. This provides a useful record for later review.

☐ 8. Conduct a debriefing interview with each expert in a face-to-face situation or over the telephone.

☐ 9. Make the experts' job easier. Suggest that they may dictate their comments on a cassette tape rather than writing them down.

☐ 10.Emphasize by your words and actions that you take the walk through seriously and not as a political exercise. You may not be able to incorporate all suggestions, but make a conscious effort to consider every one of them.

How To Conduct a Developmental Test

BEFORE YOUR FIRST DEVELOPMENTAL TESTING SESSION:

☐ 1. Clean up your training materials so that the student is not unnecessarily confused. Make sure that your pages are not full of typos and your audiotape is audible. Don't strive for perfection or become emotionally attached to your product.

☐ 2. If the training material does not require the student to make frequent active responses, prepare a set of relevant questions to be interspersed at the end of each logical unit.

☐ 3. Prepare a criterion test to measure the training objectives. If the material requires specific entry skills and knowledge, prepare a prerequisite test.

☐ 4. Select a small group (five to ten) of students who represent the type of student for whom the training material is to be adapted.

INITIATING THE DEVELOPMENTAL TESTING SESSION:

☐ 6. Begin with the "smarter" and more expressive student Tell your group and work with him or her individually.

☐ 7. Make sure that the student understands that it is the material (and not him or her) that is being evaluated and that you are there to observe and not

☐ 8. Do not arouse the student's anxiety level by formally administering the entry test and the pretest. Informally interview the student to find out if he or she has the prerequisite knowledge. If unsure, use selected parts of the entry test. Also interview to find out if he or she has already achieved some of the training objectives. If unsure, use selected parts of the criterion test.

☐ 9. Have the student working through the material as soon as possible.

☐ 10. Use the duplicate copy or script for recording student responses, remarks and reactions.

☐ 11. Encourage and record student comments about level. Make notes of these remarks at appropriate places in your duplicate copy or script.

☐ 12. Encourage and record student comments about how the material can be improved.

☐ 13. Record nonverbal reactions of the student which indicate such things as confusion, frustration, and boredom. Briefly probe the student for the cause of these reactions if it is not obvious.

INTERVENING DURING DEVELOPMENTAL TESTING SESSIONS:

☐ 14. In scheduling your session, remember to allow time for debriefing activities. Try to use the normal time the student would spend working on the material under classroom conditions. Terminate the session before the student gets tired.

☐ 15. If you are terminating the developmental testing session in the middle, make sure that you do so at the end of some logical unit of instruction.

☐ 16. Informally interview the student to check his retention of what he has learned. Use criterion test items to structure this informal

☐ 17. Debrief the student by asking him open-end questions about the effects of the training material and ways to improve it.

☐ 18. Incorporate all revisions in the training material as soon as possible after the developmental testing session. Clean up the material for the next session.

☐ 19. Conduct individual tryouts with new students to check the revised version. Use the same procedure as before. Continue developmental testing sessions until the training material begins to produce consistent and satisfactory results. At this time make all necessary revisions and produce multiple copies of the material.

SECOND PHASE OF DEVELOPMENTAL TESTING:

☐ 1. Test the revised training material with a group of students under actual classroom conditions.

☐ 2 . Collect student responses to questions which are interspersed within the training material and in the criterion test.

☐ 3. Collect student feedback on attitude toward the training material and suggestions for improvement.

☐ 4. Construct a matrix of student responses to different questions. Inspect this matrix to identify error patterns which suggest sections to be revised.

☐ 5. Make suitable changes in the training materials to reduce or eliminate problem areas.

CONTINUED DEVELOPMENTAL TESTING:

☐ 6. Keep a master copy of the training materials. Note down student problems and suggestions for improvement and when they occur as you use the material in your classroom.

☐ 7. Periodically review your accumulated student verification notes and make appropriate changes.

REVISIONS:

☐ 8. Maintain sufficient emotional detachment from your training material. If student verification feedback consistently shows the material to be ineffective, consider aborting the project and starting from scratch. Don't throw away good money and effort trying to save useless materials.

☐ 9. Don't make any changes in the training materials without justifiable cause. Making cosmetic changes may actually reduce the effectiveness of the materials.

☐ 10. More teaching and telling are not always the best way to improve the training effectiveness of the material. When students have problems in recalling the main idea or in applying a rule, you may want to search for irrelevant content and activities and eliminate them. Be especially ruthless with cute pictures which are supposed to enrich.

Revisions Based on Developmental Test Feedback

IF . . .	**THEN consider this . . .**
Students have problems with concepts	Use a number of concrete examples. Choose examples that are clear-cut and uncluttered principles, and rules to introduce the concept. Make sure that these examples are meaningful to the students. Strengthen mastery with more complex examples later.
Students have problems in discrimination (mistake nonexamples for examples)	Present a number of nonexamples and point out what critical attributes they lack .Begin with obvious nonexamples and move toward subtler ones that require finer discriminations.
Students recall the words but cannot apply a rule	Provide more opportunities for active participation. Build a variety of questions and application exercises in the material.
Students answer questions while working through the material, but fail in the final test	Incorporate frequent reviews and increase the number of opportunities for active participation
Students come back to check with you on the correctness of their answers or do not understand why their answer is incorrect	Provide built-in feedback in the material. Have feedback statements give diagnostic information rather than merely telling the student if he or she is correct or incorrect.

Revisions Based on Developmental Test Feedback

IF . . .	**THEN consider this**
Students recall individual steps in a procedure but cannot apply the entire procedure in the right order	You are probably distracting them with exercises in each step. Begin with an example of complete application. Present larger chunks of steps before asking the student to apply them. Provide additional exercises in recalling the sequence.
Student provide correct answers in the final test but cannot use their skills/knowledge at a later time	Deliberately build up an application unit. Use a wide variety of examples to demonstrate the transfer of the skills and knowledge to other curriculum areas and to real-life situations.
Students are constantly guessing on answers to questions	Provide additional instruction. Use incorrect guesses to identify the types of student misconceptions and provide suitable remedial instruction.
Students consistently fail to achieve the objectives of the training materials	It is possible that you are attempting too big a jump too soon. simplifying your objective is a legitimate revision. It is better for more students to achieve lower-level objectives than for no student to achieve your higher-level ones.
Students have problems understanding a concept	Check the level of your language. Unless absolutely required by the training objectives, avoid difficult words and complex sentence patterns. Even if your objectives call for the mastery of uncommon vocabulary and complex sentences, start with simple and easy language.
Students have difficulty recalling earlier information	Consider dividing instruction into smaller units. Also use a suitable system of titles and headings which provide structural hooks for the recall of information.
Students have problems recalling information	See if resequencing will help. A more logical or developmental organization can improve the mastery of the content.

Revisions Based on Developmental Test Feedback

IF . . .	**THEN consider this**
Students feel frustrated from the beginning	They may lack some prerequisite skills and knowledge. Check out this hypothesis If true, produce bridging materials to precede your training material.
Students keep coming back to you with questions	Perhaps the training materials may not be suitable for use in a self-training mode. An efficient way of revising the material is to incorporate it within a tutoring set-up. This requires you to prepare training materials for peer or paraprofessional tutors to compensate for the deficiencies of the material.
Students have problems understanding the training goals	Begin with a preview or advance organizer. Use nontechnical language to briefly present what the student will be able to do upon completion of the training material
Students are confused about some of the concepts	Try illustrations and visuals. A single diagram may present the structure of a concept much more clearly than ten thousand words.

Materials Development Evaluation

- Quality
  - Final materials
  - Subject-matter
- Developmental testing
  - Walk-through process
  - Field test process
  - Students for testing
- Data collection

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Materials Development Evaluation

Formative Criteria	Questions	Rating and Comments				
		LOW				HIGH
		1	2	3	4	5
Production quality	Do the final materials demonstrate high production quality in the selected instructional media and delivery strategy?					
Instructional quality	Do the final materials reflect appropriate application of instructional design principles?					
Subject-matter quality	Is the content presented in the course accurate, appropriate, and up-to-date?					
Walk-through process	Were the draft materials reviewed by appropriate experts and revised according to their feedback?					
Developmental testing process	Were the prototype instructional materials subjected to individual or small group developmental tests and revised on the basis of the feedback?					

Materials Development Evaluation

Formative Criteria	Questions	Rating and Comments				
		LOW				HIGH
		1	2	3	4	5
Field test process	Were the near final versions of the material subjected to an appropriate test under field conditions and revised on the basis of the findings?					
Students for testing	Are the developmental/field test students representative of the target population?					
Data collection	Has the developmental/field test been planned adequately to collect reliable and valid data? Have data collection forms, instruments, and equipment been appropriately prepared?					

Media Selection

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Video Review

PART I. OVERALL REVIEW

	poor			excellent	
1. Is the problem clearly defined?	1	2	3	4	5
2. Statement of objectives. (Are the course objectives stated in an acceptable format?)	1	2	3	4	5
3. Tests (or test specifications). (Do the tests or their specifications directly measure the achievement of all instructional objectives?)	1	2	3	4	5
4. Was a Learner analysis properly conducted?	1	2	3	4	5
5. Does the Training Need analysis include a detailed listing of Skills and Knowledge Necessary?	1	2	3	4	5
6. Is the Story-board clear and concise and well organized?	1	2	3	4	5
7. Is the Script clear and concise and well organized?	1	2	3	4	5
8. Does the video tell a logical, believable and relevant story?	1	2	3	4	5
9. Difficulty level. (Is the difficulty level of the course suited to the target population rather than being too hard or too easy?)	1	2	3	4	5
10. Learning activities. (Does the course include appropriate learning activities for different events of instruction?)	1	2	3	4	5

Video Review

PART II. Film Design Variables

☐ 1. Clarity of content. Meaning and Organization

- Simple, succinct verbal commentary. Do not confuse or inundate the perceptual fields used in learning
- Watch elaborate attention gaining devises or over extensive use of optical effects.
- No extraneous devices and effects.

☐ 2. Rate of Development. Frequency and/or rate of producing facts.

- Rate should be challenging but not too slow, rate should be aimed at the median learner.
- Use previous learner analysis to determine rate for each "chance' of information.
- Consider what learners will be doing while viewing the information; i.e. listening, writing, role-play.
- Film length vs. content, keep content to manageable amount but speed the program to get content across if necessary.

☐ 3. Repetition and Frequency. Can have a significant impact on learning but must be monitored for fatigue and monotony.

- Summaries significant chunks and conclusion
- Declarative Statements with Inserted questions
- Testing Pre, Post and Embedded
- Written study guides and outlines
- Simultaneous visual and auditory messages
- Learner control the number of repetitions they would like

Video Review

☐ 4. Practice and Feedback. Make your program active by asking questions, using role play and simulation

- Splice in questions etc. and stop the program for set time to allow participant to formulate response
- Leave film, program open ended allow discussion at end to complete the passage.

☐ 5. Participation and Involvement . Program should be produced just as if the learner was there in the action.

- Should be from the viewers perspective
- Use scenario that is familiar to learner and one that he can relate to
- Use characters that will be judged as prestigious
- Assign a character to learner or groups of learners discuss the role at conclusion.

Materials Development Shortcuts

1. Use more walk-through and less field testing.
2. Conduct fewer developmental tests and field tests.
3. Act as the field test instructor yourself.
4. Do not include all subgroups in the field test.
5. Relax field condition requirements, if necessary.
6. Do not measure trainee reactions to course.
7. Record data only on major changes to be made.
8. Allow instructors to correct minor problems.

IMPLEMENTATION

Planning for the pilot testing of the course should occur as early as possible in the training development process. Responsibility for all necessary environmental items such as room and equipment need to be determined and documented. Scheduling of the initial offering and frequency and duration of classes once the course is brought on-stream also need to be agreed to. The manager should work closely with the client , SME's and others that need to be present in order to assure the course can be delivered immediately upon completion. The predominant part of the audience should be members of the target audience. The teacher/instructor should also be present for the initial offering in order to gather real time feedback from the participants and document any changes that may be needed. During implementation clues to look for include (Abella 1986.) : 1. Participants talking or not talking about the program. 2. Non-participants not being encouraged to join in conversations. 3. Many cynical remarks. 4. Participants not doing assignments. 5. Participants are late at start or breaks or skip out altogether. 6. Participants do not ask for help or additional information or ideas. 7. Humorous remarks made in class that have no connection to class activities. All these may be signs of impending problems that need further investigation adjustment. The adjustments having been made it is now time for the full release of the program. This should only be done when the following have been answered to the clients and your satisfaction:

1. Was the original need accurately defined?
2. Were the objectives appropriate to meet the need?
3. Does the program design achieve the objective?

4. Is the content appropriate to the objective?

5. Are the materials of good quality? interesting and well written?

6. Do the materials do what the design intends them to do?

Checklist of Activities during Implementation

Specify requirements

- ☐ For instructors or administrators of the course.
- ☐ Training facilities and equipment.

Secure

- ☐ Suitable instructional staff.
- ☐ Suitable administrators for self-paced courses.

Coordinate

- ☐ Schedule training to meet organizational needs.
- ☐ Monitor implementation of the course. with counterparts in other organizations

Evaluation.

- ☐ Plan for suitable follow-up evaluation.
- ☐ Prepare strategies and instruments for data collection during follow-up evaluation.
- ☐ Analyze data from follow-up evaluation.
- ☐ Prepare follow-up evaluation report.

Instructional Technology Review

OVERALL REVIEW

- **Delivery Strategy** see job aid "Training Delivery strategies"
  - Statement of Objectives
  - Testing Level 2
- **Course Content**
  - Methods
  - Media
- **Learning Activities**

Instructional Technology Review

PART I. OVERALL REVIEW

	poor				excellent
1. Delivery strategy. (Is the delivery strategy the most cost-effective one?)	1	2	3	4	5
2. Statement of objectives. (Are the course objectives stated in an acceptable format?)	1	2	3	4	5
3. Tests (or test specifications). (Do the tests or their specifications directly measure the achievement of all instructional objectives?)	1	2	3	4	5
4. Course content. (Does the course present all critical information related to the objectives rather than nice-to-know, superfluous, or trivial facts?)	1	2	3	4	5
5. Instructional media. (Does the course use the most cost-effective combination of media?)	1	2	3	4	5
6. Instructional method. (Does the course use the most cost-effective combination of instructional methods?)	1	2	3	4	5
7. Learning activities. (Does the course include appropriate learning activities for different events of instruction?)	1	2	3	4	5
8. Production quality. (Do the media achieve high production standards?)	1	2	3	4	5

Instructional Technology Review

Part II Congruency Check

- Inputs
- Procedure
- Outputs

Will the activities enable the student to process the content and achieve the objective in the most efficient and effective manner possible?

9. Difficulty level. (Is the difficulty level of the course suited to the target population rather than being too hard or too easy?)	1	2	3	4	5
10 Practice and review. (Does the course provide appropriate opportunities for the practice and review of critical skills and knowledge?)	1	2	3	4	5
11. Feedback to students. (Does the course have provisions for immediate feedback to students after they complete various exercises and tests?)	1	2	3	4	5
12. Transfer and application. (Does the course emphasize the application of skills and knowledge to job/task performance?)	1	2	3	4	5

PART II. CONGRUENCY CHECK

1. Briefly describe the performance problem which your course is designed to solve.

2. Briefly describe the skill/knowledge requirements for your course.

3. Summarize the overall instructional objectives for your course.

4. Obtain a copy of the posttest for your course.

5. Collect all the materials that provide the content for the course.

6. List all the important teaching-learning activities in your course.

HOW TO DO THE CONGRUENCY CHECK:

1. Check your statement of the performance problem against the corporate mission and goals
   - ☐ Is this performance problem worth solving?
2. Compare your skill/knowledge requirements against the performance problem.
   - ☐ If your target performers acquire these skills and knowledge, will it eliminate the performance problem?
3. Compare your overall goal for the course (and other instructional objectives) against your skill/knowledge requirements.
   - ☐ Are the objectives directly related to the skills and knowledge?
4. Compare your posttest against the instructional objectives for the course.
   - ☐ Does the test measure the achievement of these instructional objectives?
5. Check the course contents against the final test.
   - ☐ Will these contents help the student achieve a high score on the posttest?
6. Compare your teaching-learning activities against the course contents and the posttest

How To Introduce a Course

- Focus
- Planning
    - Teamwork
    - Materials
    - Instructor
- Location
    - Student selection
- Monitoring & Revision

How To Introduce a Course

☐ 1. Focus. As you plan for the inaugural offering of the course, remember the purpose of the activity:

- To familiarize potential users of the course with its features.
- To provide initial training for those responsible for implementing the course.

☐ 2. Planning. Plan for the introduction of the course as early in the training development process as possible. (Such early planning will ensure that there is no significant delay between the field test and the implementation.)

☐ 3. Team work. Work with your client, Training Manager, and Training Delivery personnel to plan for - the introduction of your course.

☐ 4. Details. With other members of the implementation team, work out a distribution of roles and responsibilities, administrative details, and budget.

☐ 5. Student selection. Specify target students for the course and the number of students to be trained each time the course is offered. Working with others, select suitable students for the introduction.

☐ 6. Location. Working with other members of your team, identify a suitable site for the introduction. If possible, offer the course at a client's location.

☐ 7. Materials. Make multiple copies of Student Guides, Instructor Guides, and other course materials. Package these materials and ship them to the course location, well ahead of the scheduled date.

☐ 8. Instructor. Identify requirements for instructors for the course. Select a suitable instructor for the introduction. Train the instructor to implement the course.

☐ 9. Monitoring. Supervise the activities of the instructor. Provide necessary guidance and feedback.

☐ 10. Revision. Although "final" revisions have been completed earlier after the field test, you may identify a few new problems during the introduction. Make suitable revisions as soon as possible.

How to Prepare Instructors

1. Instructor role. As you develop the course, pay special attention to the roles and responsibilities of the instructor. These may range from administering a self-instructional course (in which case the instructor will be referred to as the course *administrator)* to providing all the content and activities. Make a note of all major instructor activities.

2. Guide preparation. Prepare a comprehensive guide for an instructor-led, materials-based course. With the other types of courses, prepare a suitable instructor or administrator guide.

3. Instructor requirements. Throughout the development of the course, note down various requirements for the instructor. Classify these requirements in terms of subject-matter expertise, training skills, and implementation skills.

4. Selection. Working with the client, Training Manager, and Training Delivery personnel, decide how many instructors are needed to implement the course. Identify and recruit suitable candidates for the instructor's job.

5. Familiarization. Walk the instructors through the course materials. Have the instructor review the materials and prepare a list of questions. Clarify the content and format of the course.

6. Training. Train the instructor in as close to an on-the-job situation as possible. Here is an appropriate training sequence:

- ☐ Have the instructor attend as a student while you teach the course.
- ☐ Have the instructor observe you while you teach the course.
- ☐ Have the instructor teach some parts of the course while you teach the others.
- ☐ Ask the instructor to teach the course while you observe.
- ☐ Ask the instructor to teach the course on his or her own. Be available for assistance.

7. Follow-up. Monitor the instructor's performance from time to time. Provide appropriate suggestions to the instructor.

How To Prepare Instructional Materials

1. Master copy. Soon after the field test, make final changes in the instructional package. Prepare a master copy of all course materials.

2. List. Prepare a list of all materials for the course. Be sure to include the following:

- ☐ Precourse materials
- ☐ Student Guide
- ☐ Other student use materials
- ☐ Job aids
- ☐ Case materials
- ☐ Instructor Guide
- ☐ Background readings for the instructor
- ☐ Overhead transparencies
- ☐ Mediated materials (videotape, audiotape, or slides)
- ☐ Tests (and other measuring instruments)

3. Mock-up. Produce one copy of each material in its final form. If the pages are to be copied front and back, verify they are copied correctly. Assemble, punch, and bind the materials in appropriate binders.

4. Duplication. Decide how many copies of each material are needed. Be sure each student will have a copy of relevant materials and a few additional copies will be available for the instructor and any observers. Have copies duplicated, collated, bound, and packaged.

5. Shipment. Decide how the materials are to be distributed to the students. Mail out precourse materials well ahead of time. Ship copies of student materials and other materials to the course location, well ahead of time. As a backup, hand carry a master copy of all materials when you travel.

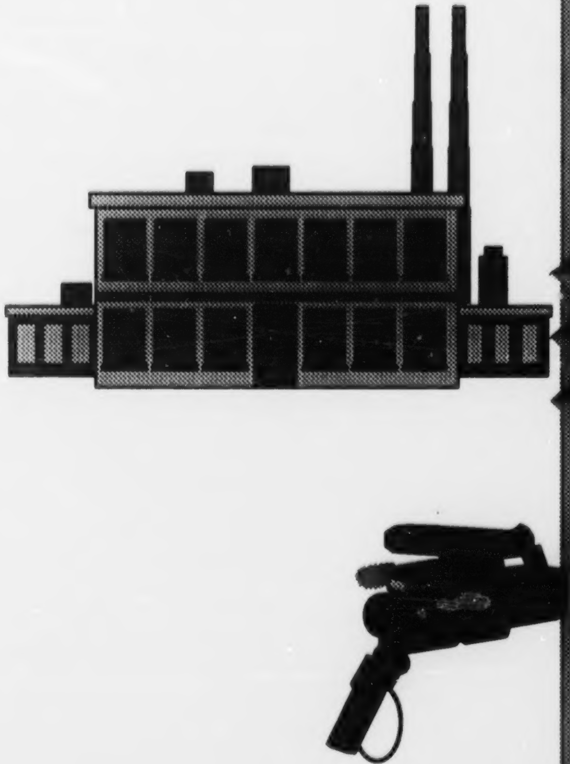
6. Daily check. At the beginning of each day of the course, prepare a checklist of materials required for the day. Double check that these materials are available.

7. Distribution. At the beginning of the first day of the course, distribute all student materials. Walk the students through different materials and verify they have all materials. You may decide to withhold some materials (e.g., school solutions) to prevent the students from intentionally or inadvertently looking ahead. However, remember the more different pieces you have, the greater the danger of missing materials.

8. Follow-up. At the end of each day, collect the course materials and replace them in the package. For example, collect and organize all transparencies in a binder so that they are ready the next time.

How To Prepare Facilities and Equipment

- Planning factors
- Listing requirements
- Room arrangement
- Space
- Media equipment
- Work equipment
- Verification



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How To Prepare Facilities and Equipment

1. **Planning factors**. In preparing facilities and equipment for the course. think of the number and type of students, the duration of the course. and the primary delivery strategy. These factors determine the facilities and the equipment you need.

2. **Listing requirements**. Walk through each lesson or module of the course and make a list of equipment and facilities needed. Identify types of activities (e.g., individual study, small-group role-play, or large group presentation).

3. **Room arrangement**. Specify the furniture and room arrangement. Here are four general arrangements:

- ☐ Theater style with chairs in rows. This is appropriate if the course primarily revolves around lectures and mediated presentations.
- ☐ Classroom arrangement with table space for each student. This is appropriate if the student has to do a lot of writing.
- ☐ Banquet arrangement with small (usually round) tables with chairs around them. This arrangement is appropriate if the course involves several small-group activities.
- ☐ U shape with tables and chairs in a semicircle and the instructor in front. This arrangement is appropriate for courses with fewer than 15 students.

4. **Space**. Specify how much space is needed in the classroom. If you are planning to change the arrangement frequently, make sure there is enough room to move the chairs and tables around.

5. **Media equipment**. Make a list of media equipment needed for each lesson. Be specific for example, if you are going to use videotapes, specify the format Include TV monitors and screens (for overhead projection) in the list.

6. **Work equipment**. Your course may involve demonstrations and hands-on practice on different equipment used on-the-job (e.g., a personal computer). Review the Instructor Guide and other course documents to identify what kinds of equipment are needed when.

7. **Verification**. Upon arrival at the course location, check all of the equipment (and the right type of equipment) are available. If your course is of more than a day's duration, check the equipment at the beginning of each day.

Data Collection in Follow-Up Evaluation

To answer these follow-up questions	**Use these data sources and strategies:**
1. Adequacy of Course Development	Content analysis of
Is the course designed to solve a specific performance problem?	Performance Analysis Report Learner Analysis
Is the course based on the characteristics and preferences of the students?	Training Needs Analysis Report Task Details Worksheet
Is the content of the course based on a systematic training needs analysis?	Skill-Knowledge Requirements Worksheet Instructional Objectives Worksheet
Is the delivery strategy for the course based on the training needs analysis data?	Tests (and Test Specifications) Evaluation Reports
Are the skills and knowledge taught in the course relevant to the job?	Field Test report Final versions of all course material
Are the instructional objectives of the course clearly specified?	Interviews with Course development team members
Are the tests valid and criterion referenced?	Field test students
Are the learning activities effective?	Instructors
Is the course revised on the basis of evaluation?	
Do the field test data indicate effectiveness?	

2. Reliability of course implementation	
How is the course supposed to be implemented?	Interviews with Instructors Observation in sites where the course is being conducted
Is the implementation plan practical?	
Is there a discrepancy between the directives and the actual implementation of the course?	Students, Course Managers, Instructors
What are the causes of these discrepancies?	Content analysis
How can we make the course more feasible?	Instructor Guide, Administrator Guide
3. Student reactions	Interviews with
What are the positive reactions of the students to different aspects of the course?	New students, Graduates
What are the frequent student complaints and concerns?	Questionnaire about the course administered to Students, Instructors
	Interviews on student reactions to the courses with Instructors, Managers
4. Instructional effectiveness	Content analysis of
What are the instructional gains due to this course?	Posttest results Embedded test results
How effectively and reliably do the students achieve the course objectives?	Interviews with Students, Instructors

5. Management reaction	
What are the positive management reactions toward the course?	Managers, Supervisors
What are the major complaints and concerns of managers about the course?	Questionnaires for Managers
What are the future plans for the course?	Supervisors
6. Relevance	Interviews about relevance of the course with
How relevant are the skills and knowledge taught in this course to the realities of the workplace?	Graduates, Supervisors, Managers, Subject-matter experts
What are the problems in transferring and utilizing the skills from the course?	
Has the work situation or procedure been changed? Has the technology changed?	

Implementation Evaluation

Formative Criteria	Questions	Ratings and Comments				
		LOW				HIGH
		1	2	3	4	5
Implementation planning	Was a detailed and realistic plan for the implementation of the course prepared?					
Preparation for implementation?	Were materials, instructors, and facilities and equipment for implementing the course prepared in a timely and effective fashion?					
Course introduction	Was the course introduced in a systematic and effective manner?					
Follow-up evaluation	Was the follow-up evaluation planned systematically and implemented effectively?					
Follow-up impact	Does the course result in an identifiable and documented benefit to the Company? If not, have suitable recommendations made to revise it?					

Course Maintenance Checklist

1. The length of the course is: adequate inadequate
5 4 3 2 1

Evaluation Criteria: Do all students finish the course? Are some units too long or too short? Does the course pace seem too fast or too slow?

Comments:

2. The instructor guide is: adequate inadequate
5 4 3 2 1

Evaluation Criteria: Is the technical content complete? Is the documentation well organized? Is the format easy to follow? Are the directions clear?

Comments:

3. The student materials are: adequate inadequate
5 4 3 2 1

Evaluation Criteria: Are student materials complete? Do they look professionally produced? Are they easy to read? Do students refer to them?

Comments:

4. The mediated materials used in the course are:
adequate inadequate
5 4 3 2 1

Evaluation Criteria: Are the mediated materials sufficient? Are slides and transparencies clear? Does the media enhance the learning? Are they appropriate? Comments:

5. The course objectives are:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Are objectives clear and concise? Do they stress key skills and knowledge? Do they help organize the materials?

Comments:

6. The tests included in the course are:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Are these tests available? Are they sufficient? Are scoring guides provided for each test? Do the tests measure required skills and knowledge?

Comments:

7. The exercises in the course are:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Are the exercises sufficient? Are they challenging and meaningful? Can they be evaluated?

Comments:

8. The technical content of the course represents the current state-of-the-art:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: How long has the course been taught? How recently has it been revised?

Comments:

9. The teaching strategies used in this course are:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Does the course provide for student exercise and evaluation? Are students involved? Does learning take place?

Comments:

10. The organization of the course is:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Does the course flow smoothly? Are lessons and units integrated?

Comments:

11. The case problem used in this course is:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Are the number of case problems adequate? Do they relate to the students work experience?

Comments:

12. Student interest and motivation in the course is:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Do students react positively to the course? Do students seem enthusiastic in class?

Comments:

13. Student feedback on the course indicates the course is:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Is the student feedback summary data positive? Is the student comments positive?

Comments:

14. The value of the course to the students job needs is:

adequate inadequate
5 4 3 2 1

Evaluation Criteria: Do students need this course to do their jobs? Does the course provide them with the required skills and knowledge to do their jobs?

Comments:

Summative Evaluation of Training

EVALUATION OF TRAINING

The intent of this section is to provide a framework for evaluation and revision via the personal computer i.e. a sort of job aid that when implemented should organize and simplify the process. I will deal with summative evaluation only in this paper, although this is only part of the evaluation strategy. Formative evaluation the other half of a Evaluation system of course, is the subject of this entire book.

The most useful model of evaluation I have found is Kirkpatricks level of evaluation or the adaptation by Brethower and Rumler . The tool can be used as follows: Level 1 Are the trainees happy? Level 2 Does the training do what it is supposed to do? Level 3 Are the concepts used (see attached survey pg. SE 8-10) Level 4 Does application of the concepts affect the organization? For each of these levels the who- source of data, what- to measure, where- find data, why- criteria, and how- data gathering method must be answered.

The role of the training function with respect to follow up is to assess the extent the new ideas, skills and motivation will get a natural opportunity for exercise and reinforcement. And having done this to recommend steps to overcome any obstacles.

This tends to be overlooked by the Training Manager who often omits to conduct any follow up. We tend to look at the completion of a program as the end of responsibility. This attitude indicates insufficient understanding of the learning process. One has to be thankful that the natural inclinations of people to seek reinforcement on their own without waiting for interest to be shown by others .

Planning

Evaluation of training begins like every other business function with Planning. The core competencies of the enterprise must first be determined and stated this becomes the input to the training and evaluation subsystems. The training strategy is next developed beginning with a mission statement which includes this strategy : the training strategy is to train to help develop, update, and maintain core competency established by the business Carr (June 92' Training)

The training systems purpose is to enable someone to improve their performance Carr (June 92' Training). This is distinguished from Education and Development which should be measured in a whole different manner due to latent learning and the establishment of lifelong patterns of learning and knowledge acquired.

Evaluation should then be looked at as part of a broader performance system i.e. a subsystem within training which in itself is a subsystem of the larger bus system. One of the goals of training is to increase the utility of training defined as : UTILITY = EFFECTIVENESS + EFFICIENCY i.e. you can add time to a course which will lower the efficiency but will increase the learning (effectiveness). Since this is essentially a trade-off process (one increases while the other decreases) the only way to increase utility is by process improvement Carr (June 92' Training). Training looked at as a system has an Input, a Process, and an Output. Feedback in the form of these several techniques mentioned below and accompany revision are paramount . The evaluation system within training then should be based on the this utility formula.

Philosophy of Evaluation

Dugan Laird (1978) states Training evaluation is based on three philosophy all of which are important but one of which is primary (the one utilized when push comes to shove) they are:

1. Contribution to goal bottom line results.
2. Achievement of learning objective. (right objective taught and learned, so you increase the likelihood they will use, back on job i.e. another deparTeacher/Instructorents problem.
3. Perception of worth. (set environment for learning let learner judge utility, worth and value)

Good training looks at all three and what you report and what you do not reflects what you think is important.

Levels of Evaluation

Level One

Most training is measured at this level and some at level two. (Gordon Training August 1991). We make a mistake here by worrying about the training function as separate from the larger performance system and concentrate on did you like it or did you feel the training was good . "Happy sheet's", are they are referred to are often sneered at by those that say it does not measure quality but the entertainment value of training.

This need not be the case, level one can tell you important information about Initial customer satisfaction but don't pretend it is telling you something about higher levels of evaluation (Gordon 1991.). The most important use is to tell if a presentation technique is adding or detracting from the learning process i.e. the achievement of objectives.

Cognitive Psychology stresses the acquisition of material and schema development

the presenting of material should be such that it enhances these processes. this is accomplished by one or more of the following methods when applicable:

1. organization of material
2. frequent review
3. relevant examples
4. practice and feedback on performance
5. engaging the learner (involvement)

What is actually needed (and could be enhanced by the use of spreadsheets)is a statistically valid study of the correlation between techniques gathered from the level one questionnaire and the learning of the objectives.

Level Two

A measure of the learning that occurred (if any). While there are many methods from paper and pencil tests to actual performance of the task wherever possible the closer testing is to the real back on the job performance needed the greater the chance of transfer. At this level we need to be certain we recognize and distinction between knowledge and application of the skill. Passing a paper and pencil test on the handling of Sulfuric acid does not assure a catastrophe will not result the first time a person encounters the real thing. It is not a matter of simply did they learn what you wanted them to, but rather is it what you really wanted to accomplish? There is no simple regurgitation of information that will substitute for actual demonstration of the performance this is not Education i.e. the school system of our childhood.

Level 3

Transfer of training back to the job (see Training Follow-Up Survey) means the extent to which the skills learned in a training environment are actual applied to the job. It is generally recommended that this evaluation be conducted 3 to 6 months after completion of training by a organization independent of the Training Organization. The focus of the evaluation is really to determine why or why not the training is being used .Recalling our goal of maximizing utility, it is equally important this analysis should be scrutinized for other more efficient methods of achieving our objectives i.e. job aids and CBT (particularly important if just in time training is important to our business.)

Success in this phase like the other involves planning throughout the training cycle as follows:

1. Initially, the familiarization and the support of supervision for the endeavor.
2. The opening of the course stating goals and expectations of the course including how it will be used back on the job..
3. Learner contracts which include the intended applications of the learning.

4. Post course support provided by one the following:

- Post training discussions trainee/supervisor
- Support groups

Level 4

Effects on bottom line business results (profit, sales, quantity, quality, safety etc.) If we focused on our Training Strategy (defined above) and performance and training need analysis are correctly done this become a easy matter of training to cure a performance discrepancy. Performance Analysis should have discovered what the problem is costing.and evaluation to determine to what extent training cure it after the fact should produce some reasonable results. Dana Robinson (1991) states the key to good evaluation and good training is to established a causal link between a skill deficiency and a business problem preferably one that can easily be quantified attached. Business results are then a simple matter of tracking the same indicators you tracked before the program began; now you want to see if anything happened. Most of us get into trouble by poor planning and slipshod execution of the analyses phase the business results are very difficult to ascertain after the fact. It is to fishing for results i.e. we did not know what we were doing now we want to see if anything happened.

Summary

Training is part of a larger system which has goals it wishes to achieve. Training strategy need to be linked to these goals. Training then must be viewed as a process with inputs processes and outputs . Utility measures the effectiveness of the training system. To increase utility then is to improve the process. Metrics on training should thus provide feedback on how training could be improved i.e. how to increase utility by effectiveness or efficient . This process of feedback and subsequent revision is paramount to any system. Spreadsheets provide a means for data collection and analyses which simplify the process.

TRAINING FOLLOW-UP SURVEY

Course Title__________________ Dates Attended_______________

Course Objective ____

A. At the end of the course, to what degree did you feel that you achieved the objective stated

LITTLE		SOME		VERY MUCH
1	2	3	4	5

IF YOU CIRCLED less THAN A 3 ON QUESTION A. STOP HERE AND RETURN THE QUESTIONNAIRE, OTHERWISE CONTINUE.

B Since completing the course, how often have you used the skills that you learned in the class on your job assignments?

NEVER		OCCASIONALLY		DAILY
1	2	3	4	5

C. As a result of this course, how much the training helped you in completing your job assignments?

LITTLE/NO IMPROVEMENT		SOME IMPROVEMENT		MAJOR IMPROVEMENT
1	2	3	4	5

IF YOU ANSWERED QUESTIONS B OR C WITH A 3 OR GREATER, THEN GO ON TO QUESTION E. IF YOU ANSWERED QUESTIONS B OR C WITH LESS THAN A 3, THEN GO ON TO QUESTION F.

E. Place a check next to each reason below that might explain why you have applied the skills you learned to your job assignments:

____ My supervisor required me to use the new skills.
____ I received help from others in my work area.
____ I was given necessary time and/or tools to apply the skills.
____ I received training at the right time to provide me with the skills when I needed.
____ The skills I learned applied directly to my job assignment.
____ My supervisor discussed with me how my new skills would be used on my job.
____ Other please list other factors that helped you apply these skills to your job.

F. Place a check next to each reason below that could explain why you have not been successful in applying skills learned to your job assignments:

____ My supervisor did not require me to use the skills.
____ My supervisor was not aware of what skills I learned.
____ I was not given time/tools to implement the skills on the job.
____ There was no one to help me implement the skills in my work area.
____ The skills did not seem to apply to my job assignment.
____ My job assignment changed so these skills did not apply.
____ The training was not timed right for my job assignment.
____ Other. Please describe other reasons you did not apply the skills to your job assignments.

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